THE IRON TRADE REVIEW

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BOOKS OPENED FOR RAIL ORDERS

And Negotiations Progressing Satisfactorily---Makers of Basic Trying to Check Ruinous Competition

Although there have been no decided changes in market conditions during the past week, indications of improvement are not entirely lacking, and there is increasing evidence that the winter's business will be more satisfactory than was believed possible a short time ago.

Iron Ore

Statistics of October ore shipments from the Lake Superior ranges are not yet available in detail, but reports from three of the upper lake docks indicate a considerable shortage compared with September shipments. During October last year, the fleet moved 6,625,801 tons. The movement during this October will be practically 2,000,000 tons less than that amount. From now on, the movement of ore will fall rapidly, though the total movement for the season will probably be greater than that of last year. Trans-Atlantic shipments for the month were light, while those from Newfoundland amounted to about 20,000 tons, and those from Cuba to about 100,000 tons.

Blast Furnace Activity

Statistics of blast furnace production for October are not yet available, but will show a reduction as compared with September. During the past few days, a number of blast furnaces, including three of the Cambria Steel Co., one of the Jones & Laughlin Steel Co., and several in eastern Pennsylvania, have been blown out, and the Carnegie Steel Co., which is now operating about 63 per cent of its capacity, has arranged to bank four Ohio furnaces two days each week, if necessary to check the accumulation of additional stocks.

Rails

Rail makers have opened their books for steel rail orders for next year's delivery. It is understood that the Erie railroad has already placed its order for 1911 requirements, and that the tonnage will be fully up to last year's total. Negotiations with other lines are progressing favorably, and announcements of a number of contracts will probably be made within a few days. The price for 1911 delivery will be the same as for a number of years, $28 per ton for Bessemer and $30 a ton for open-hearth, but a new basis for quoting for domestic use has been adopted, by which prices will be quoted on the 100-pound unit instead of by the gross ton, as heretofore, making the quotation $1.25 per 100 pounds for Bessemer, and $1.34 per 100 pounds for open-hearth. This action harmonizes the rail product with the method of quoting other finished lines.

Pig Iron

The most interesting development in the pig iron market has been the increased activity in basic. In the east, there is inquiry for a large tonnage of basic pending. The Inland Steel Co. has made an additional purchase of 6,000 tons, which will come from a furnace in the Buffalo district. The Andrews Steel Co., Newport, Ky., is in the market for 6,500 tons, and some other inquiries are pending. A meeting of the manufacturers of this grade of pig iron is being held in the east in an effort to check the extreme competition which has resulted in sales below the cost of manufacture. Bessemer pig iron is quiet, but the price of $15, valley, is being firmly maintained. Foundry grades show little life, and in some sections there is evidence of weakness. In the Birmingham district from 8,000 to 10,000 tons were sold last week at $11 for No. 2, but buyers are not willing to pay an advance of 50 cents for next year's delivery.

Ferro Sales

Recent activity in ferro-manganese, which is closely connected with the recent visit of English makers to this country, has resulted in sales amounting to 8,000 to 10,000 tons. A Youngstown company has purchased 2,500 tons for delivery throughout next year at $39, seaboard, and a western company has bought 2,000 tons.

Railroad Buying

The Hawley lines have re-issued their inquiry for 7,500 tons of cars. The Delaware, Lackawanna & Western has placed an order for 1,000 freight cars, the largest order of its kind to be placed for a long time. Of the 1,000 cars, 500 steel underframe box cars and 250 all-steel hopper cars were awarded to the American Car & Foundry Co., and 250 all-steel hopper cars were taken by the Pressed Steel Car Co. The steel for 500 all-steel cars to be built by the Norfolk & Western will be supplied by the Carnegie Steel Co. The Pennsylvania railroad will build 500 all-steel underframe cars at its Altoona, Pa., shops.

WORLD'S IRON MARKETS

PITTSBURG

Greater Activity in Near Future Indicated—Railroad Buying.

Office of THE IRON TRADE REVIEW,
510 Park Building, Nov. 1.

Developments in some branches of the iron and steel trade during the past week have been of an encouraging nature. Notwithstanding that, with the possible exception of one or two lines, shipments from mills are heavier than the tonnage involved in new orders, buyers apparently are showing more confidence in the general situation and prices of finished steel products are firm. In several instances, the action of manufacturers in opening books for the first quarter and first half of 1911 has resulted in some fairly large awards being negotiated, and, while buyers and sellers have not agreed upon prices for forward delivery in all cases, the character of trading at present indicates greater activity in the near future.

One of the encouraging features is the definite statement that some of the larger transportation companies have practically decided upon their rail and car requirements for next year and that some awards will be announced shortly. The Pennsylvania Railroad Co. has authorized the building of 500 steel underframe box cars at its Altoona, Pa., shops. These cars will be included in the 1911 schedule. Of the 1,000 freight cars to be built for the Delaware, Lackawanna & Western railroad, 250 will be built by the Pressed Steel Car Co. An award will be made in a few days for 2,500 tons of plates to be used in gas holder construction at Kansas City. It has practically been decided that the 12,000 tons of plain material for the Long Island railroad elevation and grade crossing elimination work, for which the Ft. Pitt Bridge Co. has the general contract, will be furnished by a local independent steel company.

Plates, shapes and bars are still quotable at 1.40c, Pittsburg. Semi-finished steel prices are practically unchanged. Several inquiries for billets and sheet bars for 1911 delivery are under negotiation, but makers will not accept the business at prices offered by users. The wire market continues to be the most active branch of the local trade. Some fairly large contracts for sheets and tin plate for delivery over the first quarter have been made, but there is little new business in tin plate for prompt shipment and production is being curtailed accordingly.

Prices of basic pig iron are firmer and it is doubtful whether $13, valley, could be shaded even for immediate shipment. There has been enough trading in Bessemer to show that the market is firm at $15, valley, especially for delivery over first quarter and the first six months of next year. Additional trading in furnace coke for delivery next year is noted. A sale of about 10,000 tons a month over first half at $1.90, ovens, is reported, but all details have not been made public. It is stated, however, that consumers are now showing a disposition to cover for future requirements at prices which they would not consider a few weeks ago.

Pig Iron.—Contrary to expectation, some of the inquiries for pig iron noted last week have not been acted upon and it is likely that one or two inquiries will be withdrawn as prices quoted are somewhat higher than expected. Perhaps the most important feature of the local situation is the firmer tone noted in the basic market. While it is conceded that sales of 1,000 and 3,000-ton lots were made recently on a basis of $13, valley, it has been pretty well established during the past few days that additional iron cannot be picked up at this price and the market is now quotable at $13.25, valley, for immediate shipment, with an advance of from 50 to 75 cents a ton for delivery over the next four or five months. Furnace interests have not only declined offers of $13, valley, by middlemen, but have rejected similar offers by consumers. There has been no important trading in basic during the week. A Newport, Ky., interest is in the market for 6,500 tons of basic, 1,000 tons each for November and December and 1,500 tons each for January, February and March of next year.

The Union Steel Casting Co., Pittsburg, closed for 1,500 tons of Bessemer, first hglf delivery, at $15.90, delivered, or $15, valley. Five bids were submitted and this is regarded as ample proof that $15, valley, cannot be shaded, especially for delivery early next year. Reports that this price has been shaded on prompt delivery business have not been confirmed. Reports are heard of heavy tonnage of Bessemer being under negotiation, but definite information is lacking.

The Westinghouse Air Brake Co. has not yet closed on its inquiry for gray forge and malleable. The inquiry for upward of 1,500 tons of malleable for delivery west of Pittsburg over 1911 has been withdrawn. There has been comparatively little trading in foundry grades and prices are about the same as a week ago.

The monthly average of pig iron prices as announced for October shows the average on Bessemer to have been $15, valley, or $15.90, Pittsburg, as compared with $15.02, valley, or $15.92, Pittsburg, for September. The basic average was $13.15, valley, or $14.05, Pittsburg, as compared with $13.83, valley, or $14.73, Pittsburg, for the preceding month. Recent sales of basic at low prices, concerning which all details were not officially reported, were not considered in figuring the average price of basic for October. We quote the market as follows:

Pig Iron Prices.

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.25
Basic, Pittsburg	14.15
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	14.15
Malleable, Pittsburg	14.40

(First Quarter.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.50
Basic, Pittsburg	14.40
No. 2 foundry, Pittsburg	15.40
Gray forge, Pittsburg	14.65
Malleable, Pittsburg	14.90

Ferro-Alloys.—There has been a sale of 1,200 tons of ferro-manganese to a consuming interest just west of Pittsburg for delivery over all of 1911 at a price slightly above $38.75, Baltimore. Several other sales in lots of from 50 to 500 tons each for delivery over the next eight months have been made on a basis of $38.50, Baltimore. There

appears to be a shortage of 50 per cent ferro-silicon for immediate shipment and additional sales have been made during the past week on a basis of $60, Pittsburg. There is very little contract buying at present and prices for delivery over the first six months of 1911 range from $57.50 to $58, Pittsburg. There is a fair demand for domestic ferro-silicon.

We quote ferro-manganese at $38.50, Baltimore, for prompt and first quarter of 1911. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $57.50 to $58, Pittsburg, for first half, with an advance of from $1 to $2 a ton for immediate shipment; domestic, 12 per cent, $25; 11 per cent, $24; 10 per cent. $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—The market on plates is showing a little more activity than a week ago, and indications are that new business in November will be fairly heavy. The Delaware, Lackawanna & Western railroad has placed an order for 1,000 freight cars, 250 all-steel hopper cars, to be built by the Pressed Steel Car Co., and a similar number of hopper cars and 500 steel underframe box cars going to another company. The Pennsylvania Railroad Co. has authorized the construction of 500 steel underframe box cars at its Altoona, Pa., shops. These cars will be included in the 1911 schedule, definite announcement of which will be made later. The Pressed Steel Car Co. has also received an order for 50 steel freight cars from the Canadian Pacific railroad. Local car plants are gradually curtailing output, but the plants will not be closed entirely, providing some of the inquiries now pending are acted upon within the next month. An award will be made within the next week for about 2,500 tons of plates for gas holder construction at Kansas City. A similar award was made to an eastern mill this week for gas holder construction work on the Pacific coast. Definite action has not yet been taken regarding plain material for United States government boats under negotiation. The tone of the market in general is decidedly brighter and 1.40c, Pittsburg, is regarded as the absolute minimum. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ¼ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—Several large contracts for sheets have been placed in this market for first quarter delivery on a basis of 2.20c for black No. 28 and 3.25c for galvanized No. 28. Consumers continue to specify rather freely against running contracts. New business for November and December shipment shows a slight gain, with the result that the general tone of the sheet market is firmer than for some time. Fewer reports are heard of low prices, although the minimum figures given below are still being quoted by some plants on particularly desirable business. Present sheet prices are nominal, as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, Nos. 3 to 8, 1.55c to 1.60c; Nos. 9 and 10, 1.60c to 1.65c; Nos. 11 and 12, 1.65c to 1.70c; Nos. 13 and 14, 1.70c to 1.75c; Nos. 15 and 16, 1.80c to 1.85c; box annealed sheets, Nos. 10 and 12, 1.80c to 1.85c; Nos. 13 and 14, 1.85c to 1.90c; Nos. 15 and 16, 1.90c to 1.95c; Nos. 17 to 21, 1.95c to 2c; Nos. 22 to 24, 2c to 2.05c; Nos. 25 and 26, 2.05c to 2.10c; No. 27, 2.10c to 2.15c; No. 28, 2.15c to 2.20c; No. 29, 2.20c to 2.25c; No. 30, 2.25c to 2.30c; galvanized sheets, No. 14, 2.30c to 2.35c; Nos. 15, 16 and 17, 2.45c to 2.50c; Nos. 18 to 22, 2.60c to 2.65c; No. 24, 2.70c to 2.75c; No. 26, 2.90c to 2.95c; No. 27, 3.05c to 3.10c; No. 28, 3.20c to 3.25c; No. 29, 3.30c to 3.35c; No. 30, 3.50c to 3.55c; painted roofing sheets, $1.55 to $1.60 per square for No. 28 gage, 2½ inch corrugation, and galvanized roofing sheets, $2.75 to $2.80 per square for No. 28 gage, 2½ inch corrugation.

Tin Plate.—There is comparatively little new business in tin plate being booked for delivery over the remainder of the year, and production is being curtailed. Several mills have been closed and others will go down the latter part of this week. Some of the independents which have been running full time for the past several months will operate only half time, beginning Nov. 15. Notices have been posted at some of the plants of the leading interest, regarding the closing of mills, but it has not been definitely decided to what extent production will be curtailed, as some of the mills which are idle at present are closed for repairs. Some fairly large contracts have been placed for delivery over the first three months of next year at today's prices. The base price on tin plate is as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburg district.

Rails and Track Material.—Transportation companies continue to specify rather freely against running contracts for standard rails. There is very little new business for prompt shipment developing, as both the steel companies and the railroads are now actively engaged in figuring estimates for 1911 requirements. It is expected that within the next few days there will be some encouraging developments regarding rail orders for 1911 and that some of the larger trunk lines will place their awards. Local rail mills are operating on a fairly satisfactory basis for this season of the year and it is not likely that there will be any further curtailment in the output for another month or so. Demand for light rails is only moderate. Some of the railroads are buying spikes and track bolts in fairly large lots and prices appear to be firm. We quote the market as follows, the base price on open-hearth rails being $30, mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $26.50 to $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.55c to 1.60c, Pittsburg; hand spikes, 1.65c to 1.70c, Pittsburg; track bolts, 2.30c, Pittsburg.

Steel.—Several inquiries for billets and sheet bars for delivery over the first quarter and first half of next year are noted in this market, but few transactions of this character have been negotiated. New business for November and December shipment is light, as most consumers are covered by contracts for their full requirements up to Jan. 1. Bessemer billets are reported to have sold as low as $23, makers' mill, Pittsburg, but confirmation is lacking. The bulk of the trading has been done at $23.50, makers' mill, Pittsburg, and it is doubtful whether any business has been placed above $24, makers' mill, Pittsburg. Open-hearth billets are quotable at $24.50, makers' mill, Pittsburg. Bessemer sheet bars are quotable at $25, makers' mill, Pittsburg, although this figure probably could be shaded on desirable business. Demand for open-hearth sheet bars is light and the bulk of the trading apparently has been done on a basis of $24.50, makers' mill, Pittsburg. Forging billets have been sold as low as $29, Pittsburg, although some mills report sales at an advance of $1 a ton over this figure. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $23 to $24, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets, $24.50 to $25, Pittsburg. Forging billets are quotable at $29 to $30, Pittsburg. Bessemer sheet and tin bars are quoted at $25, and open-hearth sheet bars are quoted at $25, makers' mill, located within the $1, Pittsburg, freight limits.

Hoops and Bands.—The total volume of business in hoops and bands booked during October exceeded that

of the preceding month, while orders entered on mill books have been correspondingly large. There is little contract buying at present. Prices are firm. We quote the market as follows:

Hoops in carload lots, 1.50c; in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—In a few instances contracts for steel bars have been accepted in this market to cover the first three months of next year on a basis of 1.40c, Pittsburg, although users are still confining purchases to cover urgent needs. Reports that 1.40c, Pittsburg, has been shaded in the western districts have not been confirmed and no sales have been made in this section below that figure. In all cases, users are demanding prompt shipment. There is heavier buying of bar iron on the part of the railroads and the market is firm at from 1.40c to 1.45c, Pittsburg. Very little new business in shafting is appearing and production has been curtailed at a number of plants. We quote the market as follows:

Common iron bars, 1.40c to 1.45c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3-inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Muck Bar.—Demand for muck bar is fairly heavy, several local mills having large orders on their books, and are practically out of the market as far as delivery over the next several weeks is concerned. We quote higher grades at $30 to $31, Pittsburg.

Structural.—There is a more optimistic feeling regarding the outlook for this market over the last two months of this year. An award likely will be made during the next few weeks, for plain material to be used in the erection of new foundry buildings near Pittsburg. Negotiations have practically been concluded whereby a local independent steel company will furnish about 12,000 tons of plain material for elevation and grade crossing elimination work along the Long Island railroad, for which the Fort Pitt Bridge Co. has been given the general contract. The Pennsylvania Railroad Co. has awarded contracts for about 200 tons of bridge material. The McClintic-Marshall Construction Co., Pittsburg, has taken contracts for the Press building, Pittsburg, which will include slightly over 400 tons of steel, and the Pennsylvania Railroad Co.'s Cortland street ferry house, New York, which will require 1,750 tons of steel. We quote the market as follows:

Beams and channels, 15 inches and under, 1.40c; over 15 inches, 1.50c; zees, 1.40c; tees, 1.45c; angles, from 3 to 6 inches, 1.40c; over 6 inches, 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.40c.

Merchant Pipe.—Demand for line pipe is only moderately heavy. No large awards have been made in this market, but the total volume of business entered during the month of October has assured steady operation at some plants during the remainder of the year. In a few instances mills have been closed temporarily. A local interest has closed for eight miles of 3 to 8-inch gas line pipe and other orders include small lots of 3, 6, 8 and 10-inch line pipe. There is an inquiry in this market for 35 miles of 6-inch oil line pipe, which probably will be closed this week. Demand for merchant steel pipe is fairly good and jobbers report a big decrease in stocks. There is only moderate buying of iron pipe. Prices announced on new cards issued Oct. 1 are being maintained. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Iron and Steel Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	72	58	68	54
½ inch	75	63	71	59
¾ to 1½ inch.....	79	69	75	65
2 to 3 inches.....	80	70	76	66
	Lap weld.			
2 inches	76	66	72	62
2½ to 4 inches.....	78	68	74	64
4½ to 6 inches.....	77	67	73	63
7 to 12 inches	75	59	71	55
EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
⅛, ¼, ⅜ inch.....	69	59	65	55
½ inch	74	68	70	64
¾ to 1½ inch	78	72	74	68
2 to 3 inches.....	79	73	75	69
EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	75	69	71	65
2½ to 4 inches.....	77	71	73	67
4½ to 6 inches.....	76	70	72	66
7 to 8 inches.....	69	59	65	55
9 to 12 inches.....	64	54	60	50
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
¼ inch	64	58	60	54
¾ to 1½ inch	67	61	63	57
2 to 3 inches.....	69	63	65	59
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	65	59	61	55
2½ to 4 inches.....	67	61	63	57
4½ to 6 inches.....	66	60	62	56
7 to 8 inches.....	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—On account of the curtailment in the output of some of the locomotive works during the past month, specifications against contracts for boiler tubes show a slight decline and new business is rather light. We quote the market as follows:

	Steel.	Iron.
1 to 1½ inch	49	43
1¾ to 2¼ inch	61	43
2½ inch	63	48
2¾ to 5 inch	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.
2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—Some of the wire mills in this section are operating day and night, and are two and three weeks behind in deliveries. This market made an exceedingly good showing during the month of October, when compared with other branches of the local iron and steel trade. New business continues to come in at a fairly satisfactory rate, particularly from western jobbers. Several large contracts for wire nails are noted and in some instances price concessions have been made on particularly desirable business. There is also a good demand for cut nails and the bulk of trading is being done on a basis of $1.65 for jobbers' carload lots. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.65 to $1.70; retailers' carload lots, $1.70 to $1.75; cut nails, jobbers' carload lots, $1.65; painted barb wire, jobbers' carload lots, $1.70; retailers' carload lots, $1.75, with 30c for galvanizing; plain wire to jobbers in carloads, $1.50, and to dealers, in carloads, $1.55; polished staples, $1.70; galvanized staples, $2.

Wire Rods.—A somewhat firmer tone is noted in the market on wire rods, due to the heavier demand for wire products. Trading is chiefly for small lots, owing to the attitude of several makers, who will not sell very far ahead at today's prices. We quote $28.50 to $29, Pittsburg, on Bessemer and open-hearth rods.

Coke.—Consumers of furnace coke are giving considerable attention to their requirements over the first half of 1911, and indications are that there will be some fairly large awards within the next 10 days. A transaction involving in the neighborhood of 10,000 tons of furnace coke a month over the first half of next year on a basis of $1.90, ovens, is reported, although all details of this transaction have not been made public. Last week there was a sale of 15,000 tons of furnace coke for delivery over the six months, beginning Jan. 1, on a basis of $1.75, ovens, but it has since developed that sellers of standard Connellsville coke will not accept contracts on that basis. There is very little trading in prompt furnace or foundry coke, as consumers generally are well covered for their requirements to the first of the year. Inquiries for foundry coke for delivery over the first half of next year are appearing, but few transactions have been negotiated so far. Some of the operating companies in

the Connellsville region are again complaining of a shortage of water, and unless there is some relief within the next week, it is likely that some ovens will be closed temporarily. A shortage of laborers is also reported in some quarters. We quote standard Connellsville furnace coke for prompt shipment at $1.55, ovens, and on contract, at from $1.80 to $1.90, ovens. On high grade Connellsville foundry coke, we quote from $2.05 to $2.20, ovens, for prompt delivery; on contracts, from $2.25 to $2.50, ovens. The Connellsville *Courier's* figures for the week ending Oct. 22, show 27,469 active ovens with an output of 351,085 tons, compared with 27,495 active ovens and a production of 351,988 tons the previous week.

Old Material.—A more optimistic feeling is noted in the local scrap market and sales for prompt shipment involve slightly heavier tonnage. Prices are not any higher than a week ago, but it is doubtful whether the quotations given below could be shaded, even on desirable business. Bids will close Wednesday of this week on the list put out by the Pennsylvania Lines West of Pittsburg. The October list of the Pennsylvania lines east of Pittsburg will in all probability be issued within the next few days and it is believed that the major portion of this tonnage will go direct to consumers. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$14.00 to 14.25
Rerolling rails	15.00 to 15.50
Bundled sheet scrap	10.50 to 11.00
Iron axles	24.00 to 24.50
Old iron rails	15.00 to 15.50
No. 1 wrought scrap	14.50 to 15.00
Old car wheels	13.50 to 14.00
Low phosphorus	17.50 to 18.00
Machine shop turnings	9.00 to 9.25
Cast borings	8.25 to 8.75
No. 1 cast scrap	14.00 to 14.25
Malleable	14.00 to 14.50
Stove plate	11.00 to 11.50

CHICAGO

Inland Steel Co. Buys Basic—Finished Lines Steady.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Nov. 1.

A perceptible improvement in pig iron and a steady condition in finished lines characterizes the iron and steel market in the Chicago district at present. Some pig iron sellers in going over their books for October find that the month just past showed a very encouraging volume of sales, although most of the tonnage went in small lots. Structural lettings reported in this market during the week past are encouraging, the total contracts let amounting to 3,700 tons, with 3,600 tons additional being figured on. There is still some shading of the 1.40c, Pittsburg, price on plates in this market. The sheet and wire business continue to be the most active departments in the trade.

Pig Iron.—The most interesting transaction of the week was the purchase of another block of basic by the Inland Steel Co., amounting to 6,000 tons, for melting at its Indiana Harbor plant. The iron will be shipped by water from a Buffalo furnace during the season of navigation this year, and the price is stated to be $14.55, delivered to the dock at Indiana Harbor. The Inland Steel Co. expects to blow in its own blast furnace again on Dec. 1. Both furnaces of the Northwestern Iron Co., at Maysville, Wis., are now in blast. We note the sale of 600 tons of southern iron for first half delivery to an Illinois foundry at $11.50, Birmingham. A Chicago manufacturer is in the market for 700 tons of foundry iron, 3 per cent silicon or over, for first half delivery. A Wisconsin threshing machine manufacturer is still in the market for 7,000 tons of foundry iron, half northern and half southern. A Chicago steel maker has purchased 300 tons of 80 per cent imported ferro-manganese at a price said to be $42, Chicago. Inquiry in the local market is improving. Buyers seem to be more willing to consider propositions for the price of iron and there is also less disposition on the part of northern furnaces to waive premiums for first quarter delivery.

We quote the market, f. o. b. Chicago, as follows:

(This year's delivery.)

Lake Superior charcoal	$18.00 to 18.50
Northern foundry No. 2	16.00 to 16.50
Southern foundry No. 2	15.35 to 15.85
Southern silveries, 5 per cent silicon	16.85 to 17.35
Jackson Co. silveries 8 per cent.	19.40
Malleable Bessemer	16.00 to 16.50
Aabama basic	15.35 to 15.85

(First quarter delivery.)

Lake Superior charcoal	18.50 to 19.00
Northern foundry No. 2	16.25 to 16.75
Southern foundry No. 2	15.85 to 16.35
Southern silveries, 5 per cent silicon	17.35 to 17.85
Jackson Co. silveries, 8 per cent.	....
Malleable Bessemer	16.25 to 16.75
Alabama basic	15.85 to 16.35

Billets.—The Chicago billet market is weak and transactions are few and far between. We quote, nominally, open-hearth forging billets, f. o. b. Chicago, $28 to $29.

Merchant Bars.—The business in steel bars for October will probably show a light increase over September and future indications are encouraging. Makers of iron bars are operating their mills at about 65 per cent capacity, and there has been very little change in the volume of business during the past month. Agricultural implement manufacturers have been specifying very heavily against their contracts for merchant steel of various kinds and particularly for special steels. In some cases, implement makers have taken out the full tonnage covered by their contracts and are asking for new contracts. Shipments of steel into this territory during October will show a slight falling off as compared with September. Prices are somewhat soft for both iron and steel, but it is not probable that less than 1.35c, Chicago, can be done on iron bars at the present time.

We quote for Chicago delivery as follows:

Bar iron, 1.35c to 1.40c; hard steel bars, re-rolled, 1.45c to 1.55c; soft steel bars and bands and small shapes, 1.58c to 1.63c, base; hoops, 1.73c to 1.83c; planished or smooth finished tire steel, 1.78c to 1.83c, base; iron finished tire steel, 1.73c, base; smooth finished machinery steel, 1 inch and larger, 2.43c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 55 per cent off the list for carload lots, and 50 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c to 1.90c, per pound base; soft steel bars, 1.80c to 1.90c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material.—Contracts let reported in this market this week show an encouraging increase. The Oregon Trunk railway is in the market for 2,000 tons of bridge material. A contract for fabricating the Wilson building annex, Dallas, Tex., 800 tons, has been let to L. Schriever & Sons, Cincinnati. The American Bridge Co. has taken 125 tons of rods for Howe truss bridges for the C., M. & St. P. railway. Vierling-McDowell Co., Chicago, will fabricate an addition to the Presbyterian hospital on the west side, 330 tons. Steel work for a club house at San Francisco, for the Native Sons of the Golden West, 800 tons, has been let to the Pacific Rolling Mill, of San Francisco. Marshall Field & Co., Chicago, are in the market for the steel which will be required by a new warehouse to be erected at Fifth avenue and Polk street; the drawings show that 1,600 tons of Bethlehem shapes will be required. Figures are now being taken on this job. The Anahein Sugar Co., Anahein, Cal., is making an addition to its factory and has awarded the contract for the steel, 145 tons, to the Des Moines Bridge & Iron Co., Des Moines, Ia. Milliken Brothers have taken a contract for fabricating 1,000 tons of Bethlehem

shapes for the Cortez hotel, San Francisco. A contract for the Shubert theater, Denver, Colo., 500 tons, has been let to Loweth Brothers, Denver. The total contracts let, as reported in this market, amount to 3,700 tons, with 3,600 tons additional being figured on.

We quote, mill price for structural shapes, Chicago delivery, as follows:

Beams and channels, 15 inches and under, 1.58c to 1.63c. For extras, see Pittsburg report.

We quote, local store prices, as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.90 per 100 pounds; angles over 6 inches, $1.90 to $2 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.80 per 100 pounds, base; channels, 3 inches and larger, $1.80 per 100 pounds, base.

Rails and Track Supplies.—The local mills are fairly well supplied with business, but new orders for rails continue to run very light. All the indications, however, point to the fact that leading western railroads are seriously considering their 1911 rail requirements and large contracts for standard rails are confidently expected in the near future.

See Pittsburg report for prices on standard sections.

On light rails and track supplies, for Chicago delivery, we quote as follows:

Light rails, 35, 40 and 45-pound, $26; 16, 20, 25 and 30-pound, $27; 12-pound, $28.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section re-laying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.70c to 1.75c; smaller size spikes, 1.75c, base; track bolts with square nuts, 2.25c to 2.30c, base.

Plates.—Local plate mills continue to operate at a fair gait. There is some shading in the market and 1.35c, Pittsburg, can be done on plates up to 80 inches in width. The Hawley lines are seriously considering their car requirements and have reissued their inquiry, which was put out some time last spring, calling for about 7,500 cars of various kinds. The Norfolk & Western, which will build the 500 all-steel hopper cars for which it recently inquired, at its own shops, will purchase the steel from the Carnegie Steel Co. It is reported that the D., L. & W. has let its contract for 500 steel underframe box cars and 500 all-steel hopper cars.

We quote, Chicago delivery, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.53c to 1.63c. For extras, see Pittsburg report.

Store prices are as follows, f. o. b. Chicago:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.90c; from 72 inches to 96 inches wide, 1.90c to 2c; 3-16 inch up to and including 60 inches wide, 1.90c to 2c; 72 inches, 2.15c to 2.25c; No. 8, up to 60 inches wide, 1.95c to 2.05c. Flange quality and heads, 25c extra.

Sheets.—Business in sheets continues to be fairly active and buyers throughout the territory west of Chicago are purchasing quite freely. The local mills are operating at a very good gait.

Blue annealed No. 10, 2.10c to 2.20c; No. 12, 2.20c to 2.30c. Box annealed, No. 28, 2.75c to 2.85c. Galvanized, No. 28, 3.65c to 3.75c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—The wire market continues to be one of the bright spots in the situation. The agricultural trade is very good and further strengthening of the situation is bound to come on account of the somewhat depleted condition of stocks in the hands of dealers throughout the northwest. Nails are fairly active and prices remain unchanged.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $2.03; with 30c for galvanizing; plain wire to jobbers, $1.68; plain wire, retailers' carload lots, $1.73; staples, bright, $1.88.

Merchant Pipe and Tubes.—October will not show any particular change as compared with September, except probably more activity in the heavier sizes of high-pressure steam pipe. Common sizes of merchant pipe continue to move freely and there is considerable inquiry for tubes from boiler shops and similar industries.

We quote, iron and steel pipe out of stock, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛-⅜ inch	68.2	53.2	62.2	47.2
½ inch	71.2	58.2	65.2	52.2
¾ inch	76.2	65.2	71.2	60.2
4½-6 inches	73.2	62.2	69.2	58.2
7-12 inches	70.2	53.2	66.2	49.2
EXTRA STRONG PLAIN ENDS.				
½ inch	69.2	62.2	....	....
¾ inch	74.2	67.2	....	....
⅞ inch	64.2	....	....	....
DOUBLE EXTRA STRONG.				
½ inch	57.2	49.2	....	....
¾ inch	62.2	54.2	....	....
⅞ inch	52.2	40.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	..	..	57½
1¼ to 2¼ inch	50	35	35
2¾ to 5 inch	60	48	46

Cast Iron Pipe.—All bids for 6,500 tons of water pipe asked for by the city of Detroit have been rejected. It is not probable that this business will be readvertised, but it is expected that the city will purchase privately. Routine business in water pipe continues fairly good.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $27; 6 to 12 inches, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Old Material.—The scrap market is practically featureless. Melters are very well supplied with material. Dealers also have heavy accumulations on hand and railroad stocks are heavy. The result is that any attempts to buoy up prices meet with little success. Old material is accumulating faster than it is being consumed, which is resulting naturally in a weak market.

We quote, f. o. b. Chicago, as follows:

GROSS TONS.

Old car wheels	$12.00 to 13.00
Old iron rails	15.75 to 16.25
Rerolling rails (5 ft. and over)	15.00 to 15.50
Old steel rails (3 ft. and under)	13.00 to 13.50
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	11.50 to 12.00

NET TONS.

No. 1 R. R. wrought	$11.75 to 12.25
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers and springs	11.25 to 11.75
Shafting	16.50 to 17.00
Iron car axles	19.25 to 19.75
Steel car axles	19.25 to 19.75
Locomotive tires	16.00 to 16.50
Dealers' forge	10.50 to 11.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 150 lbs. and less	12.00 to 12.50
No. 1 busheling	9.75 to 10.25
No. 2 busheling	8.00 to 8.25
No. 1 boiler cut	8.75 to 9.25
Boiler punchings	14.25 to 14.75
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.25 to 10.75
Stove plate and light cast scrap	11.00 to 11.50
Angle bars, splices, etc., iron	13.25 to 13.75
Angle bars, steel	11.50 to 12.00

CLEVELAND

Fair Pig Iron Inquiry.—More Tone To Finished Market.

Office of THE IRON TRADE REVIEW,
Penton Building, Nov. 1.

Iron Ore.—Reports received of the shipments from several of the upper lake docks, indicate that the shipments for October will show a sharp decrease, compared with September and October of last year. Complete reports are not yet available.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.

Pig Iron.—The General Electric Co. is in the market for the first time for

its new plant at Erie, Pa. It is asking for 7,300 tons for delivery during the first quarter of next year. Of this tonnage, 7,000 tons is divided among No. 1, 2, 3 and 4 foundry, and 300 tons of 5 to 6 per cent silicon. Basic quotations are firmer, and $13.25 valley is now the minimum. The Andrews Steel Co., Newport, Ky., is in the market for 6,500 tons, of which 1,000 tons is for delivery in November, 1,000 tons for delivery in December, and the remaining 4,500 divided equally among the first three months of next year. We quote, delivered in Cleveland, as follows:

No. 1 foundry	$14.75
No. 2 foundry	14.25
No. 2 Southern	15.35
Gray forge	14.00 to 14.25
Bessemer	15.65 to 15.90
Lake Superior charcoal	18.00 to 18.50
Jackson Co. 8 per cent silvery	19.00 to 19.50

Coke.—There is very little interest in the coke market in Cleveland, but the tendency is toward higher prices. On a sale of a few thousand tons of spot coke through a Cleveland agency, a little more than $1.55 was obtained. On contracts for first half of next year, $1.90 is the usual asking price.

Connellsville furnace coke $1.55 to $1.60 for prompt delivery, and $1.70 to $1.75 on contracts for this year. Connellsville foundry coke, $2.05 to $2.20 for prompt and $2.25 on contract for this year.

Finished Material.—There seems to be a little improvement in finished materials. This is noticeable in greater firmness in some lines, as for example, polished shafting is not now selling at less than 55 per cent off for carloads, and 50 per cent in less than car loads, although sales had recently been made as low as 60 per cent off for carloads. Prices of nuts and bolts, which have been very much demoralized, have been advanced from 5 to 6 per cent over recent quotations. In competition between the Carnegie Steel Co. from its Pittsburg warehouse and the local jobbers the warehouse price of the former is supposed to be 1.75c, Pittsburg, on shapes, plates and bars, but it is understood that the Carnegie company is meeting the prices of jobbers when necessary, although no case is reported that the Pittsburg warehouse has cut below the jobbers' prices. Some sales in Cleveland at less than 1.80c Cleveland have been done. Additions to the plant of the Cleveland Foundry Co. will require about 300 tons of steel, which has not yet been purchased by the erecting company, the Forest City Steel & Iron Co. Very little structural business is pending at present, although there are some excellent prospects.

Old Material.—Dullness that has been characteristic of the local market for some weeks still continues to rule. Very little quantity of material is passing and these unchanged quotations, f. o. b. Cleveland, are largely nominal:

Old iron rails	$16.00 to 16.50
Old steel rails (under 6 ft.)	14.00 to 14.50
Old car wheels	14.00 to 14.50
Old steel boiler plate	12.00 to 12.50
Malleable iron (railroad)	13.25 to 13.75
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	12.00 to 12.50
Heavy steel	13.00 to 13.25
Country mixed steel	12.25 to 12.75

We quote, in gross tons, as follows:

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.00 to 12.50
Axle turnings	9 00 to 9.50
Machine shop turnings	6.00 to 6.50
Grate bars	10.50 to 11.00
Pipes and flues	11.00 to 11.50
Tank iron	9.00 to 9.50
Sheet iron	5.00 to 5.50
Wrought drilling	6.50 to 7.00
Stove plate	11.00 to 11.25
Cast borings	6.00 to 6.50

CINCINNATI

Inquiry for Basic Improves—Central Ohio Sale Reported.

Office of THE IRON TRADE REVIEW,
Room 11, Blymyer Bldg., Nov. 1.

Pig Iron.—Inquiry has perceptibly strengthened, and some well scattered buying has resulted during the past week. A brighter and more buoyant sentiment has developed, and a better tone is evident in conditions generally. There is very little interest centered in this year's requirements, as it is generally understood that but very few consumers remain, who have not covered for this period. Several well-defined inquiries from both large and small consumers are now pending, some of which will certainly be closed within the next day or two. Southern furnaces are apparently maintaining established quotations, and are unwilling to deviate from these figures, excepting perhaps, where contracts specify deliveries are to begin at once and run throughout the first part of next year. Under these conditions, the $11 price could doubtless be obtained, although the generally accepted quotation for this period is $11.50, Birmingham. Northern prices continue on the same basis as last week's quotations, and are fairly strong. It is said, however, that the basic market in eastern territory has strengthened to some extent, and that the cheaper iron has practically disappeared. The pipe shops are said to be very busy, and are buying large blocks of iron.

A large melter in this territory is inquiring for 7,500 tons of basic for next year's delivery. A Kentucky manufacturer is asking quotations on 1,000 tons of analysis iron, divided equally between northern and southern grades, December to May delivery. One large industry in southern Ohio is inquiring for 200 tons of ferro-manganese. A central Ohio melter is figuring on 1,200 tons of foundry grades. In addition to these inquiries, there is more than the usual run of those from 100 to 200 tons. A sale of malleable of 1,000 tons is reported in Indiana territory for early delivery, at $14.25, Ironton. Another concern in the same territory bought 600 tons of southern foundry No. 2 for first six months' delivery, at $11.50, Birmingham. One of the large melters in central Ohio is said to have bought 1,500 tons of malleable, 1,000 tons of northern charcoal, 1,000 tons of northern and 1,000 tons southern foundry grades, while another concern in the southern part of the state contracted for 1,000 tons of analysis iron, on specifications that were very liberal.

We quote freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

	1910.	First quarter, 1911.
Southern foundry No. 1		$14.75 to 15.25
Southern foundry No. 2		14 25 to 14.75
Southern foundry No. 3		13 75 to 14.25
Southern foundry No. 4		13.75 to 14.25
Southern No. 1 soft		14.75 to 15.25
Southern No. 2 soft		14.25 to 14.75
Southern gray forge		13.75 to 14.25
Northern No. 1 foundry		15.70 to 15.95
Northern No. 2 foundry		15.20 to 15.45
Northern No. 3 foundry		14.70 to 14.95
Jackson county 6 per cent silicon		18.20
Jackson county 8 per cent silicon	19.20 to 19.70	
Jackson county 10 per cent silicon		20.20

Coke.—There is some improvement shown in inquiry for all grades of coke and prices are holding well. Shipments under contract are moving satisfactorily, and consumers are taking them without question. Furnace inquiries are a little stronger and show some development. We quote prices from the leading coke producing districts as follows:

	Prompt Shipment.	During year.
Connellsville district:		
Foundry coke	$2.00 to 2.25	$2.25 to 2.50
Furnace coke	1.55 to 1.65	1.75 to 1.85
Wise county district:		
Foundry coke	2.00 to 2.25	2.15 to 2.25
Furnace coke	1.65 to 1.75	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.10 to 2.25	2.25 to 2.50
Furnace coke	1.65 to 1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.20 to 2.30	2.20 to 2.30

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—Plates, shapes and bars are quotable at 1.40c, Pittsburg. Some of the independent mills are said to be shading the price on plates, but generally the price is well maintained. The general trend of the market is thought to be better, although the week's specifications were below the average. There is nothing in the line of new structural that is

now pending locally, and the market is easy.

Old Material.—There are occasional evidences of an upward trend for certain grades of material, but the activity is usually of short duration. A fairly normal trade is being transacted, but there is little snap, and things are quiet and featureless. Prices are about on last week's level, and according to dealers, are as follows:

Old No. 1 R. R. wrought, net tons	$10.50 to 11.00
No. 1 machinery, net	10.00 to 10.50
No. 1 busheling, net	10.00 to 10.50
Old iron rails, gross	16.00 to 16.50
Old steel rerolling, gross	15.50 to 16.00
Old short lengths, gross	14.50 to 15.00
Old iron axles net	18.00 to 18.50
Heavy melting scrap, gross	11.00 to 11.50
Stove plate, net	8.00 to 8.50
Heavy turnings, net	6.00 to 6.50
Cast borings, net	4.50 to 5.00
Car wheels	13.00 to 13.50
Grate bars	8.50 to 9.00

PHILADELPHIA

Several Furnaces Blown Out.—Finished Market More Cheerful.

Oct. 31.

Pig Iron.—More conclusive evidence of the announced determination of different eastern pig iron makers, to shut down a part of their capacity at least, rather than to accept present prices for extended future periods or to pile stocks is presented in the blowing out of a number of blast furnaces in Eastern Pennsylvania and nearby territory. One Lehigh valley furnace and one Schuylkill valley furnace were blown out the past week. In Virginia a Longdale stack has gone out and it is announced the Princess furnace will follow about Nov. 15. Other makers in eastern territory are seriously considering similar action as soon as higher-priced contracts on books have been marked off. Consumers of pig iron in the eastern market continue to manifest a greater disposition to negotiate for their first quarter needs, but in some respects they are still assuming a receptive position and forcing sellers to carry propositions to them. On the other hand, different furnaces do not appear so willing to accept present prices for first quarter. The market shows no change in price, which in some cases for tonnage running into and through first quarter prices have been no higher than quotations for prompt delivery. Sales continue of a fair tonnage. One of the cast iron pipe companies has closed for about 5,000 tons of lower grades for January and February at from $14.20 delivered or $10, Birmingham for forge to $14.50 to $14.70, delivered for No. 3. Most of the iron bought was from southern furnaces but some southern iron was included on basis of $14.50 delivered for No. 3. The leading cast iron pipe maker is also still carrying on some negotiations for iron for its Burlington, N. J., plant. Recent purchases by stove makers in this district have been increased to about 4,500 tons. The standard grades of No. 2X in east are held at from $15.75 to $16 delivered, tidewater. In Virginia the price range is $13 to $13.50 for No. 2X. The basic market is dull as most of the large consumers will carry over considerable of this year's iron into next year. One buyer is offering $14.50 delivered for first quarter but makers are not anxious to sell at this level for such delivery, although this price has been made on prompt iron. Another eastern mill is out for 1,500 to 2,000 tons for this year and will entertain propositions for first quarter. Small sales of low phosphorus at about $22.50, Philadelphia, are reported. There is some inquiry for mill forge, upon which prices range from $14.50 to $14.75, delivered.

We quote for prompt and first quarter shipment in Philadelphia and vicinity as follows:

No. 1X foundry	$16.25 to 16.50
No. 2X foundry	15.75 to 16.00
No. 2 plain	15.25 to 15.75
Standard gray forge	14.50 to 14.75
Basic	14.50 to 15.00
No. 2X Virginia	15.80 to 16.30
No. 2 Southern	15.00 to 15.50
Low phosphorus	22.50 to 23.00

Finished Material.—Sentiment surrounding the finished material market continues more cheerful and hopeful, which arises from what are believed to be improved prospects for increased business. The tonnage at present, however, is not displaying much expansion and the steel capacities of eastern mills are engaged at from 50 to 75 per cent of maximum with the latter rate of activity rather the exception. The promise of increased railroad buying is more encouraging. From well-informed circles comes the information that the Pennsylvania railroad system will announce its 1911 requirements within a few days. The Norfolk & Western railroad has notified different mills that they will be called upon to furnish a total of about 5,000 tons of shapes and plates for the construction of 500 all steel freight cars, which that road has finally decided to build at the Roanoke, Va., shops. Some additional locomotive buying is reported this week.

Shipbuilding companies are asking for prices on the steel for two merchant vessels for coastwise trade, requiring about 2,000 tons of plates and shapes each, which are being figured upon. The government is also inquiring for the steel for six torpedo boat destroyers.

The addition to the Raleigh hotel, Washington, for which the Geo. A. Fuller Co. has the general contract, will require from 2,500 to 3,000 tons. Bids on the steel have not yet been asked. The two trust company buildings at Atlanta and Savannah, Ga., upon which general bids are being asked will require about 4,500 tons. Bids on the Atlanta building went in this week. The Southern railroad office building and freight sheds at Atlanta close Nov. 21. Revised bids for sewer construction in Atlantic City, which will require about 600 tons of steel piling, beams, etc., will be taken Nov. 15. Figures on the Union League club addition, this city, about 1,200 tons, went in this week. The Riggs building at Washington is expected to soon be up. Confirmation is lacking of a current report that R. D. Wood & Co. have bought 2,500 tons of plates from an eastern mill at a very low price for Camden, N. J. This steel is to be used for gas tank construction.

Eastern billet makers report more interest of buyers for next year's requirements but low prices are wanted by these consumers. There is a fair amount of tin plate contracting in the east, for first half.

For Philadelphia delivery, we quote as follows:

Structural shapes, 1.55c to 1.60c; steel bars, 1.55c to 1.60c; iron bars, 1.40c to 1.50c; 4 x 4-inch open-hearth rolling billets, $26, eastern mill; forging billets, $28, eastern mill.

Old Material.—An absence of pressing needs upon the part of scrap consumers is still apparent and small lot sales are working up the bulk of the tonnage. In heavy steel there is no buying of moment and some buyers are offering but $13, delivered eastern Pennsylvania, which is largely a nominal figure as no sales have been made so low. After the recent spurt in No. 1 railroad wrought, the market has again receded to about $16, delivered. The movement in cast scrap is a trifle better but prices have not been affected. Stricter specifications for wrought pipe by eastern iron mills have contributed to the recent decline in that grade. Nothing but stock over 1 inch in diameter and free from galvanizing is now being accepted by these consumers.

We quote, gross tons, delivered in eastern Pennsylvania consuming territory, as follows:

Old steel rails (rerolling)	$15.75 to 16.25
Heavy melting steel	13.50 to 14.00
Old car wheels	13.75 to 14.25
Old iron car axles	25.00 to 26.00
Old steel car axles	20.00 to 21.00
No. 1 railroad wrought	16.00 to 16.50
Wrought pipe	13.00 to 13.25

Cast borings	8.75 to 9.25
Wrought turnings	8.50 to 9.00
Heavy cast scrap	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Stove plate	10.50 to 11.00

NEW YORK

Rail Books are Opened—Considerable Iron Tonnage Sold.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Nov. 1.

Iron Ore.—Sales of local ores, aggregating about 20,000 tons, have been made in eastern territory at the prevailing prices for such ore from 6½ to 7 cents a unit, delivered. The favorable prices made have stimulated these purchases since they afford an opportunity for cheapening mixtures. The trans-Atlantic ore movement in October was comparatively light and that from Newfoundland about 20,000 tons, which is less than usual. Cuban ore receipts at Baltimore, especially, were heavy, running considerably over 100,000 tons. The Sir Ernest Cassel, a large steel steamer, built especially for the Swedish ore traffic, arrived at Philadelphia this week with a cargo of 11,000 tons from that country. The Black Sea grain movement is apparently not engaging as many ships as had been anticipated and charters from Mediterranean ports seem a little easier at this time, due to an accumulation of vessels there.

Pig Iron.—Well grounded estimates place the quantity of iron quietly purchased by some leading industrial companies through New York offices during the past ten days at about 25,000 tons. This iron is for various periods of delivery, distributed over the first half of next year. In addition, there has been more general activity among New England consumers, which has resulted in considerable purchasing, and there has been a fair amount of buying for consumption in the metropolitan district. The buying in New England has included many of the leading melters in that district, but it is to be noted that the tonnage closed invariably was only part of that inquired for. A manufacturer of fire extinguishers, who was out for 2,500 tons, bought about 1,500 tons, a maker of special appliances 1,000 tons, while two valve interests closed for about 3,000 tons, including 1,000 tons of Virginia iron. New England machine tool interests and other shops have also been buying quite freely, but usually in smaller lots. The market in that district rules from about $16.00 to $16.25, delivered, for No. 2X for any delivery through the first quarter. The General Electric Co. has also bought a relatively small tonnage for Schenectady. In New Jersey one consumer this week bought 1,200 tons for shipment to start immediately and another is in the market for 2,500 to 3,000 tons for first quarter. There has been the usual small lot selling in that district which aggregates a fair total. Eastern Pennsylvania makers of standard grades are selling at from $15.00 to $15.25, furnace, for prompt and first quarter shipment, and the latter price would apply to first half also. In basic, several of the steel companies have come out for good sized lots, principally for first quarter, and these aggregate a round tonnage of steel making metal. It is expected that a portion of this tonnage, at least, will be placed, although some consumers are expressing a desire not to pay more than $14.50, delivered, for first quarter. Stocks of pig iron on eastern furnace yards have shown only a slight increase in the past month. The situation as to accumulated iron in the east appears sound and this will be contributed to by the blowing out of additional furnaces now being actually done or expected to soon follow.

We quote for prompt and first quarter shipment at tidewater as follows:

Northern foundry No. 1	$15.75 to 16.25
No. 2X foundry	15.25 to 15.75
No. 2 plain	15.00 to 15.25
No. 2 Virginia	15.80 to 16.30
No. 2 southern foundry	15.25 to 15.75
Malleable	15.50 to 16.00
Gray forge	14.75 to 15.00

Ferro-Alloys.—The recent presence in this country of some of the leading English makers of ferro-manganese has stimulated selling activities in this alloy and probably 8,000 to 10,000 tons was sold during October. A steel company in the Youngstown district this week bought 2,500 tons for delivery through 1911 at $39.00, seaboard. A western mill has also taken 2,000 tons for extended forward shipment. A report from the Pittsburg district that a sale of prompt manganese was made at $38.50 is denied by the reported sellers. The prompt market seems well represented at $38.75, seaboard. There is considerable range of prices in 50 per cent ferro-silicon. We quote 80 per cent ferro-manganese for prompt and future shipment at from $38.75 to $39.00, seaboard, and 50 per cent ferro-silicon at from $53.00 to $54.00, seaboard.

Cast Iron Pipe.—The department of water supply of Greater New York is expected to bring out inquiries next week for a large tonnage of cast iron pipe, including about 7,000 tons for Staten Island. Bids went in this week on 5,760 tons of pipe and specials in contractors and direct lettings for Brooklyn, Queens and Richmond. Providence, R. I., took bids this week on 800 tons and Pawtucket, R. I., will receive proposals on 1,300 tons, Nov. 3. Yonkers, N. Y., is advertising 500 tons for Nov. 7. Some cast iron pipe makers report having received an unusual amount of inquiry from large buyers for this season of the year and expect some encouraging business to shortly result. We quote 6-inch pipe at from $22.00 to $22.50, f. o. b. New York, in carload lots.

Finished Material.—The opening of the books for 1911 orders by the rail makers, which took place this week, is expected to be followed in a short time by announcements of some large contracts. Attention in the finished market continues to be focused upon the railroad situation and inasmuch as there are clearer prospects of better business being placed in that direction, sentiment is keeping up a more cheerful front. New business is still coming in at a rate to engage eastern mills on an average of from 50 to 60 per cent of steel capacity.

The American Bridge Co. has received formal award of 7,000 tons of bridge work for the Key West extensions of the Florida East Coast railroad. The fact that the leading interest would get this order was announced some time ago. The American Bridge Co. has also received the formal award of the 2,000 tons for the Reading terminal improvements in the Port Richmond district of Philadelphia. The Monon railroad has placed 130 tons with the Wisconsin Bridge Co.

Other awards of the week have included 1,750 tons for the Cortland Street ferry house for the Pennsylvania railroad, New York City, to the McClintic-Marshall Construction Co.; 870 tons to the Phoenix Bridge Works for the Capitol power traction station at Washington, D. C.; 750 tons to the Pacific Rolling Mills for the Native Sons' Building Co., San Francisco; 500 tons to Loweth Bros. for the Shubert theatre in Denver; 540 tons to Levering & Gerrigues for a stock house for the Hupfel Brewery, New York; 400 tons to the McClintic-Marshall Construction Co. for the Press building at Pittsburg; 450 tons to the Virginia Bridge & Iron Works for a highway viaduct at Petersburg, Va.; 365 tons to Levering & Gerrigues for a warehouse in Brooklyn; 325 tons to Vierling & McDowell for the Presbyterian hospital in Chicago; 150 tons to the Des Moines Bridge & Iron Works, for the Anaheim Sugar Co. building, Anaheim, Cal. The 1,000 tons for the Cortez building, at San Francisco, will probably go to Milliken Bros., Inc., and 800 tons for the Wilson building, Dallas, Texas, to Louis Schreiber & Sons, as these fabricators are the low bidders. The bulk of the 1,400 tons for the Vinn warehouse at Eleventh avenue and Twenty-fifth street, New York, which, as announced last week, went to the Hay Foundry & Iron

Works, will be Bethlehem sections, while the plain material will go to the Eastern Steel Co. Bids have gone in for 350 tons of small bridges for the New York, New Haven & Hartford. New construction in the Charleston navy yard will require some tonnage. The Woolworth building, to be erected at Park Place and Broadway, New York City, is expected to soon be up for figures and will require 5,000 tons or more of steel. Nothing further has been learned regarding the Quebec bridge project for which the bids are under consideration.

From present indications, it is believed that the contract bids, submitted the past week on the New York subway extensions, are within the engineers' estimates. This project will require about 150,000 tons of steel.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.56c to 1.61c; beams, 3 to 15 inches, 1.56c to 1.61c; tees, 3 x ¼ inch and heavier, 1.56c to 1.61c; plates, carload, tank, 1.56c to 1.61c; boiler steel, 1.66c to 1.71c; marine boiler, 1.96c to 2.01c; bar iron, 1.40c to 1.45c; soft steel bars, 1.56c to 1.61c.

Old Material.—Outside of a very ordinary movement in heavy steel, there is little activity in the scrap market. Conditions are quieter than a week or so ago and prices are soft, although no new low levels are to be noted. Consumers exhibit no urgent needs and apparently have sufficient scrap under contract to fill their requirements, at the present rate of activity, well into the first quarter. We quote, gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap which has a local demand, as follows:

Old car wheels	12.00 to 12.50
Old iron axles	21.50 to 22.00
Old steel shafting	16.50 to 17.00
Heavy melting steel	11.25 to 11.50
No. 1 R. R. wrought	13.50 to 14.00
Iron track scrap	13.00 to 13.50
Wrought pipe	10.00 to 10.50
Cast borings	6.75 to 7.00
Wrought turnings	6.50 to 7.00
Heavy cast scrap	12.50 to 13.00
Railroad malleable	12.50 to 13.00
Stove plate	9.00 to 9.50
Grate bars	9.00 to 9.50

ST LOUIS

Orders Coming in Freely for Small Lots of Foundry Iron.

St. Louis, Nov. 1.

Pig Iron.—Orders and inquiries are coming in quite freely for small lots of all grades of pig iron, and local sales agents are of the opinion that the market in the St. Louis territory presents a little stronger aspect than it has for the last several weeks. One sale was reported today of 500 tons of northern iron, another for 100 tons of the same grade, and one for 1,000 tons of No. 2 southern for first half. In the opinion of some agents, the $11 price for southern No. 2, which has prevailed for quite a while, is rapidly disappearing, and $11.50 is more frequently heard of for delivery up to Jan. 1. There is not, however, an inquiry in the market for anything approaching a round tonnage. Northern iron is reported to be a little more in demand, with a spread in price of from $14 to $15.

Our prices for southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$15.50 to 16.00
Southern No. 2	15.00 to 15.50
Southern No. 3	14.50 to 15.00
Southern No. 4	14.00 to 14.50

Coke.—The car shortage reported last week continues to be a bother in coke shipments, but this trouble is alleviated to some extent by the lack of inquiries and sales of large amount. Most inquiries for coke are for early delivery, with prices ranging as follows:

Best-selected 72-hour Connellsville foundry grades, $2.35 to $2.50, ovens; second best 72-hour foundry, $2 to $2.25, on contract and for immediate delivery; 48-hour Connellsville furnace, $1.60 to $1.85; best 72-hour Virginia foundry, $2 to $2.35; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—We quote:

Tank plates, ¼ inch and heavier up to 72 inches wide, $1.90 to $2; from 72 inches to 96 inches, $2 to $2.10; sheets, No. 10, blue annealed, $2.30 to $2.40; bar iron, $1.75 to $1.85; soft steel bars, $1.90 to $2.

Old Material.—Demand for scrap iron continues dull, with few transactions reported, and prices remaining nominally as follows:

Old car wheels	$13.50 to 14.00
Old iron rails	14.50 to 15.00
Rerolling rails (4 ft. and over)	14.25 to 14.50
Old steel rails (2 ft. and under)	13.00 to 13.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.00 to 12.50
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.75 to 12.25
No. 2 R. R. wrought	10.75 to 11.25
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.00 to 15.50
Iron car axles	19.00 to 20.00
Steel car axles	19.00 to 20.00
Locomotive tires	16.00 to 16.50
No. 1 country wrought	10.00 to 10.50
Pipes and flues	9.25 to 9.75
No. 1 cast, 510 lbs. and less	12.50 to 13.00
No. 1 busheling	10.75 to 11.25
No. 2 busheling	7.00 to 7.50
No. 1 boiler cut	9.25 to 9.75
Boiler punchings	11.00 to 11.50
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.25 to 7.75
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Stove plate and light cast scrap	9.50 to 10.00
Angle splice bars, iron	13.50 to 14.00
Angle splice bars, steel	12.50 to 13.00

BUFFALO

Good Pig Iron Tonnage Pending—Scrap More Active.

Nov. 1.

Pig Iron.—A good tonnage has been entered in the past week and a large amount of iron is still under negotiation. One of the largest interests reports that the month of October was the best this year and improvement is generally felt. One of the most important developments is that some of the furnaces are firming up their prices, and while the quotations this week are unchanged, a slight advance is likely to be made at any time. The present prices are wholly unattractive to the furnaces, and they are still showing a disinclination to contract far into 1911. Some sales at very low figures are reported, but they are mostly for off iron, and the general tone of the market is firmer.

Inquiries are fairly strong on scattered lots. We quote, f. o. b. furnace, as follows:

No. 1X foundry	$15.00 to 15.50
No. 2X foundry	14.50 to 15.00
No. 2 plain	14.25 to 14.75
No. 3 foundry	14.00 to 14.50
Gray forge	14.00 to 14.50
Malleable	14.75 to 15.25
Basic	14.75 to 15.25
Charcoal	18.75 to 19.25

Finished Products.—The general specifications placed are lighter than last week, and the feeling seems to be that no improvement will be felt for several weeks at least. The demand for bars and structural shapes has been comparatively light, but there has been considerable interest in wire and tin plate and sizable contracts have been closed in both for future delivery. There have been no large lettings, and about the only sizable job to be figured in the immediate future is a new market house which will call for between 600 and 700 tons. The specifications are almost ready, and the department of public works will ask bids probably in about two weeks. The number of building permits issued shows a decided falling off, probably due to the coming of cooler weather.

Old Material.—There is no increased activity reported in the scrap market. Some business is being done in small amounts and prices are very low. The following schedule indicates the market:

Heavy melting steel	$12.25 to 12.50
No. 1 railroad wrought scrap	14.50 to 15.00
No. 1 railroad and machine cast scrap	13.50 to 14.00
Old steel axles	17.00 to 18.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	13.75 to 14.00
Machine shop turnings	6.75 to 7.00
Cast iron borings	5.00 to 5.50

Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	15.50 to 16.00
Tank iron	10.75 to 11.00
Sheet iron	6.50 to 7.00
Stove plate	12.00 to 12.50
Pipes and flues	10.25 to 10 75
Grate bars	11.50 to 12.00
Boiler plate	11.00 to 11.50

BIRMINGHAM

Buyers Not Willing to Pay Half Dollar Advance for Next Year.

Birmingham, Ala., Nov. 1.

Pig Iron.—A fairly decent tonnage of pig iron was booked by several of the furnace companies the past week. However, comparatively speaking, during normal times such bookings would be considered only a "drop in the bucket." Probably 8,000 to 10,000 tons were booked. The prices paid were $11 and $11.50 per ton at the furnace. For prompt shipment, and delivery the remainder of this year, iron is being freely sold at $11 per ton at the furnace. One or two special brands are commanding 50 cents per ton premium. None of the companies are pressing 1911 delivery from the fact that buyers are unwilling to pay an extra 50 cents per ton for that business. Quite a tonnage of iron could be easily booked for the first half of 1911 on a basis of $11 per ton at the furnace; but when you come down to talk $11.50 per ton with the buyer, he "side steps" and loses interest. Iron is being piled on the yards, and in the face of these conditions it is hardly reasonable to assume that buyers are going to be in any special hurry to cover their future wants very far ahead, unless at a bargain. They know that they cannot get badly hurt should a 50-cent advance occur.

Cast Iron Pipe.—No large lettings are reported the past week in water pipe. No alarm is felt, however, considering the fact that small buying continues to hold up well. Following prices, per net ton, f. o. b. cars here are quoted: Four to 6-inch, $20.50 to $21; 8 to 12-inch, average of $19, with $1 per ton extra for gas pipe.

Old Material.—Very quiet correctly depicts the scrap market. Dealers report that while the demand holds up fairly well, prices which buyers are willing to pay are prohibitive. In the absence of sufficient business to actually test the market the following nominal quotations are given per gross ton, f. o. b. cars here:

Old iron rails	$13.50 to 14.00
Old steel axles	16.50 to 17.00
Old iron axles	17.00 to 17.50
No. 1 R. R. wrought	11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Dealers' wrought	10.00 to 10.50
Old steel rails	11.00 to 11.50
No. 1 machinery	10.00 to 10.50
No. 1 steel	10.00 to 10.50
Old standard car wheels	12.50 to 13.00
Light castings, stove plate	8.50 to 9.00

British Iron Market.

Unfavorable Market Influences Successfully Resisted.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., Oct. 22.

The market has been unfavorably affected by the recurrence in an aggravated form, of the ship building deadlock, with the increase of the bank rate, and the measure of success with which these conditions have been resisted testifies to the innate strength of business. There was a fall in Cleveland pig iron on Thursday, but a recovery yesterday, of 5d, bringing the figure to 49s 11d ($12.22) cash. A considerable amount of business was done on this basis. On two days during the week, there have been increases of sales to such an extent that stocks have been temporarily reduced. The amount in store is 485,000 tons. Makers could sell considerably more iron for future delivery, but they do not care to commit themselves heavily for next year, owing to their firm belief that a great improvement may then be expected. The hematite trade shows a still more marked improvement, owing to the brighter prospects of the ship building industry. Various circumstances have made rubio ore rather dearer, so that next half year's contracts are on the basis of 21s 3d ($5.20). On the east coast, the selling price of hematite is 63s 6d ($15.54) for delivery in November and December, but 64s ($15.66) for first quarter business next year.

Finished Department.—The Birmingham quarterly meeting has generally given a fillip to business. A comfortable supply of new orders has resulted, although, so far as iron is concerned, they have been at low prices, with a very shadowy margin of profit. There is still not quite sufficient to go round among the makers of common bars. Some little influence of depression is exercised by the reports of keen competition in America, of which THE IRON TRADE REVIEW cablegram, relative to the action of the Carnegie Steel Co., furnished a striking example. Galvanized sheets are a shade easier, purchases being now possible at £11 5s. In this branch, there are many complaints of constantly increasing costs of raw material, especially plate and spelter, and some firms complain that they are producing at a loss. The tinplate boom appears to be on the up grade, a number of new mills constantly commencing. Steel continues the busiest department. Heavy bookings have been made of semi-finished metal from the Continent, and the commitments of Belgium alone for the Midland district amount to 50,000 tons.

METAL MARKETS.

St. Louis.

Nov. 1.

Lead and Zinc.—Zinc blende brought a top price of $48 a ton in the Missouri-Kansas-Oklahoma district last week, with the base price ranging from $46 to $43 for 60 per cent grades. The $48 price was the highest point reached since March, last, but was in line with the prediction of many operators and buyers. Speculative buying has been heavy, and a still further increase is expected.

The spelter market at St. Louis closed at $5.72½ Saturday—nearly 20 points higher than the preceding week. The average price paid for zinc ore was $42.83, compared to $42.21 of the week before.

The total sales of ore amounted to 5,902 tons, with a production for the week of 5,700—thus reducing surplus of 7,000 tons by 202 tons.

Calamine sold as high as $31.50, with the base price for 40 per cent lots ranging from $27 to $23. The average price paid per ton was $31.50, compared to $28.27 the week before.

Lead ore brought a top price of $55.80, with the base price at $53. The average price was $52.76, compared to $52.78 the week before. Pig lead remained at $4.27½, St. Louis, the same as at the close of the previous week.

New York.

Nov. 1.

Copper.—Conditions in the copper metal trade continue very satisfactory. A large total of sales is believed to have been made during October and prices today are firmer than they have been for several months. There is little doubt entertained that the next report of the Copper Producers' Association will show another material reduction in surplus stocks in this country, and there is every indication that a similar trend prevails in Europe. The London fortnightly statistics for the last half of October show a further decline of 5,500 tons. Well informed dealers predict 13c for electrolytic in the near future. The leading seller continues to quote 12.87½c for electrolytic, delivered thirty days, and 12.75c, cash, New York. Lake is 13c, but very little business has been reported in this grade recently.

The London market closed firm.

spot at £57 7s and three months at £58 7s.

Exports of copper for October are 27,512 tons.

Tin.—The pig tin market shows signs of renewal of activity by the syndicate today. Spot tin advanced to 36.70c at the close of business. Deliveries into consumption during October were 3,350 tons and arrivals at Atlantic ports amounted to 4,407 tons. The remainder of 1,053 tons in favor of stocks has probably been acquired by the speculators for the purpose of further exploiting the consumers.

The London market closed firm. Spot closed at £167 5s, and three months at £167 10s.

The statistics for Europe and the United States show a decrease in visible supply of 816 tons for October, and a decrease of 2,735 tons for the first nine months of the year.

Lead.—Some improvement is noted in the demand for lead and prices are somewhat firmer. The leading seller is asking 4.40c for shipment lead.

Spelter.—The price of spelter has been advanced to 5.95c in New York, and it is rumored that it will cross 6c at an early date on manipulation headed by a large local dealer, and several prominent producers. Decrease in production and higher cost lead are the explanations given, and in many respects these arguments are convincing. The demand, however, is an essential factor in any market, if an advance is to be maintained, and it must be said, in this case, that the demand is not in proportion to the rise.

Antimony.—Conditions are unchanged in antimony. Cookson's is 8.12½c, Hallett's is 7.75c, and Hungarian is 7.25c.

Chicago.

Nov. 1.

New Metals.—Business in copper during the week was fairly good and the price remains firm at 13⅛c for lake copper and 13c for casting copper. Smelters in the southwestern fields are closed down, resulting in a curtailment in the production of spelter, which keeps the price firm. Spelter has risen 0.25c in the last few days, and is now quotable at 5.70c to 5.75c, Chicago. As a consequence the list price on sheet zinc has been increased to 7.75c, f. o. b. La Salle. Tin is somewhat weaker.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 13⅛c; casting, 13c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.70c to 5.75c; lead, desilverized, 4.35c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.75 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 37½c. Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—The market remains comparatively quiet, buyers taking out tonnages only as their needs require. The market is probably a little more active than it was a week ago, and the sentiment is better, based on improved conditions in general lines and in new metals.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, 11¼c; heavy copper, 11¼c; light copper, 10½c; heavy red brass, 10⅜c; heavy yellow brass, 8c; light brass, 6¼c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 6½c; brass clippings, 8c; tea lead, 3.65c; lead scrap, 3.90c; zinc, 4c; tin pipe, 32.5c; tin foil, 29.5c; pewter, 23.5c; electrotype plates, free from wood, 4½c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $78 per ton.

PITTSBURG COAL CO.'S SHOWING THIS YEAR.

The statement of tonnage and earnings of the Pittsburg Coal Co., Pittsburg, for the nine months ending Sept. 30, shows a gain in production in the Pittsburg and Hocking districts of 1,980,188 tons over the first nine months of 1909. The production of the coke plants of the company increased 115,851 tons, the total production amounting to 459,930 tons. The gross earnings for the nine months were $3,356,414, as against $2,187,306 for the corresponding period of 1909, while the net earnings amounted to $1,333,561, as compared with $231,600 for the same period in 1909.

EUROPEAN VISIBLE SUPPLY.

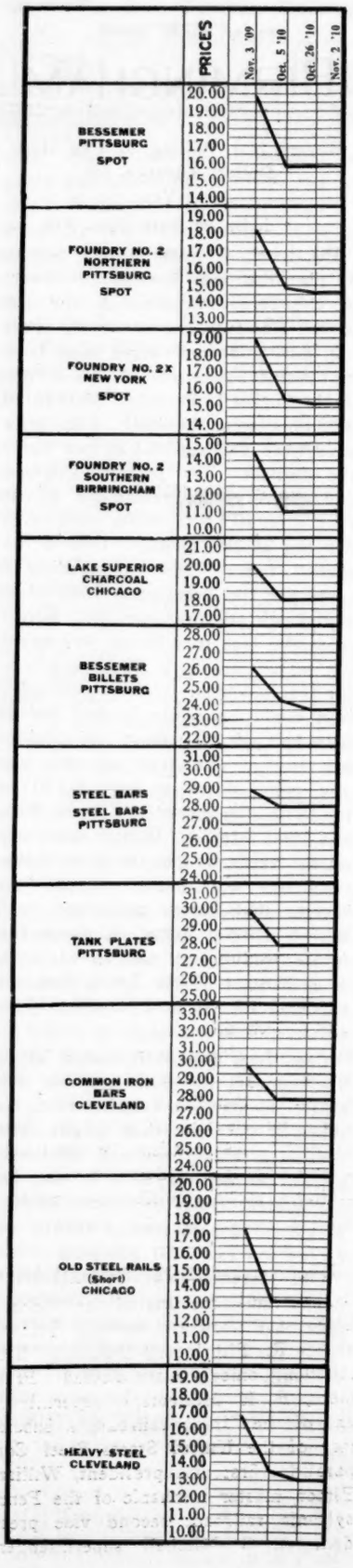
The fortnightly statistics estimate that the visible supply of copper in Europe on Nov. 1, was 88,420 tons, against 92,170 tons on Oct. 15, and 99,360 tons on Nov. 1, 1909.

OCTOBER TIN SHIPMENTS.

Pig tin shipments from the Straits for October were 4,480 tons.

The Arcade Mfg. Co., Freeport, Ill., has greatly increased the capacity of its brass foundry. Some changes have been made in the melting equipment and a large number of molding machines have been added which will enable this concern to make prompt shipments of all classes of brass and bronze castings.

PRICE CHART



IMPLEMENT MAKERS

Open Their Convention—Banquet and Other Entertainment.

St. Louis, Nov. 2.

The National Association of Agricultural Implement and Vehicle Manufacturers began a session, to last three days, in the Southern hotel, St. Louis, Tuesday evening.

The association comprises in its membership some of the largest manufacturing industries in the United States, whose products are sent throughout the world. The total capitalization of the membership is more than $500,000,000, and the annual products are valued at more than $650,000,000. More than 250,000 workmen are employed in the various plants.

The arrangement committee of the St. Louis Implement, Vehicle and Hardware Association, met in the Missouri Athletic club, Saturday, and prepared a program for the entertainment of the visitors.

Mayor Frederick H. Kreismann welcomed the delegates to the city. A banquet was given at the Southern hotel Wednesday evening, at which 500 to 600 guests were present.

The present officers of the national association are: President, H. M. Kinney, of Winona, Minn.; secretary, W. J. Evans, Chicago; treasurer, Paul E. Herschel, Peoria, Ill.

CRUCIBLE STEEL HELD AN ELECTION.

Pittsburg, Nov. 2. (By wire.)

The directors of the Crucible Steel Co. of America, organized today by the election of the old officers and members of the executive committee, with the exception of John A. Sutton, who was elected to the office of first vice president, which office has been vacant for some time. Mr. Sutton and H. D. W. English were elected to the executive committee, taking the places of J. D. Lyon and Reuben Miller. The office of second vice president, left vacant by the election of Mr. Sutton as first vice president, will not be filled for the present.

RAILWAY CLUB ELECTION.

The annual meeting of the Railway Club, of Pittsburg, was held Oct. 28, at the Ft. Pitt Hotel, Pittsburg. The following officers were elected: President, F. R. McFeeters, superintendent of the Union railroad, a subsidiary of the United States Steel Corporation; first vice president, William Elmer, master mechanic of the Pennsylvania railroad; second vice president, A. G. Mitchell, superintendent of the Monongahela division of the Pennsylvania railroad; secretary, C. W. Alleman of the motive power department of the Pittsburg & Lake Erie railroad; treasurer, J. D. McIlwain. Executive committee, L. H. Turner, superintendent motive power of the Pittsburg & Lake Erie; F. H. Stark, superintendent of the rolling stock, Pittsburg Coal Co.; and D. J. Redding, the retiring president, assistant superintendent of motive power of the Pittsburg & Lake Erie railroad. A. G. Kinyon, inspector of the Buffalo, Rochester & Pittsburg railroad, read a paper on "Locomotive Fuel Economy." About 35 new members were admitted.

FOUNDRY AND MANUFACTURERS' SUPPLY ASSOCIATION DISSOLVED.

C. E. Hoyt, secretary of the Foundry and Manufacturers' Supply Association, Lewis Institute, Chicago, in an announcement to the members, states that there was a practically unanimous vote in favor of the resolution adopted at Pittsburg to dissolve this organization. The exhibits of foundry equipment and supplies in connection with the foundrymen's conventions, which will next year be held in Pittsburg, will hereafter be conducted by the Foundry and Machine Exhibition Co. The affairs of the Foundry and Manufacturers' Supply Association will immediately be closed and the balance on hand will be pro-rated among the members.

INQUIRIES PENDING.

Pittsurg, Nov. 2. (By wire.)

The Westinghouse Air Brake Co. has not yet acted upon its inquiry for gray forge and malleable iron, amounting to about 20,000 tons and the inquiry of a radiator company for 11,000 tons of foundry iron for delivery at West Newton and Corry, Pa., is still pending.

The report of the American Steel Foundries for the fiscal year ending July 31, it has been stated, has been referred to the committee, and will not be given out for publication until the committee passes upon it.

The machine and blacksmith shops, warehouse and roundhouse at the Commodore mine, Virginia, Minn., of Corrigan, McKinney & Co., were badly damaged by fire Oct. 21, the loss being estimated at $15,000.

The foundrymen at the West Allis plant of the Allis-Chalmers Co. have been placed on an eight-hour a day schedule.

JUDGE GARY'S VIEW

Of Trade Conditions—Cramps Ship Yard Deal is Off.

New York, Nov. 2. (By wire.)

Judge Gary, in a public statement, says sufficient improvement has taken place in the past few weeks to warrant the statement that the foundation has been laid for continued betterment.

The option taken by New York attorneys in behalf of unknown parties on stock of Cramps ship yard has expired and the deal is off.

The Tennessee Coal, Iron & Railroad Co. reports 500 tons of steel rails promptly sold to the Texas City Transportation Co.

The government will open bids Nov. 7 on six torpedo boat destroyers requiring about 2,500 tons.

ENGINEERS HOLD MEETING.

The bi-monthly meeting of the structural section of the Engineers' Society of Western Pennsylvania was held, Tuesday evening, Nov. 1, in the Oliver building, Pittsburg. C. P. Wilson, engineer in wood preservation, United States forest service, delivered an address on "The Preservation of Structural Timbers From Decay." A general discussion followed.

STEEL PILING CONTRACT.

Pittsburg, Nov. 2. (By wire.)

The Jones & Laughlin Steel Co. has taken a contract involving a fairly heavy tonnage of sheet steel piling for United States government engineering work at Oswego, N. Y.

James N. Wallace, president of the Central Trust Co., New York, Frederick Strauss, of J. & W. Seligman & Co., New York, James J. Starrow & Co., of Lee, Higginson & Co., Anthony N. Brady and W. C. Durant, vice president and general manager of the General Motors Co., have been selected as voting trustees of that company and will control its policies for the next five years in accordance with the terms of the recently arranged note issue for $15,000,000.

Josephine furnace of Corrigan, McKinney & Co., Josephine, Pa., will probably be blown out next week for relining.

The Independent Electric Mfg. Co., Milwaukee, has increased its capital stock from $10,000 to $25,000.

The Otis Elevator Co. has declared the regular semi-annual dividend of 5 per cent, payable Nov. 1.

VALLEY FURNACES

Of Corporation Will be Banked if Necessary to Check Stocks.

The United States Steel Corporation has made arrangements to bank four furnaces at Ohio works, Youngstown, on Saturday and Sunday of each week, if this action be made necessary, to check an accumulation of additional iron stocks in valley territory. Whether the course of banking these furnaces will be required will depend on the rate at which specifications for finished products will be daily received. The Corporation is adding no iron to stock at the present time and is making some reduction in the total accumulation on the banks of its different furnaces. This week it is operating about 63 per cent of its blast furnace capacity, having put out one South Sharon and one Duquesne stack. The latter furnace was blown out because of an accident and will resume in about a month after being repaired.

FURNACES GO OUT IN VIRGINIA AND THE EAST.

The determination of many pig iron makers in eastern and Virginia territory to blow out stacks rather than sell at today's prices or pile additional iron, is reflected by the recent curtailment of capacity in these districts. In the Lehigh valley, one Crane furnace of the Empire Steel & Iron Co., at Catasauqua, Pa., has gone out and one of the furnaces of the Richard Heckscher & Sons Co., at Swedeland, Pa., in the Schuylkill valley has also joined the idle class. Other eastern Pennsylvania makers are considering similar action and the blowing out movement promises to be more extensive if prices do not improve by the end of the year. In Virginia, one Longdale stack has gone out and the Princess furnace will follow Nov. 15.

BLAST FURNACE OPERATIONS IN OCTOBER.

Among the important blast furnace changes in operating during October are noted the following:

The Sheffield, Ala., stack of the Sheffield Coal & Iron Co. was blown out Oct. 17, for relining.

Top stack of the Wheeling Steel & Iron Co. was out of blast three weeks in October for repairs, relighting Oct. 20.

The Central Iron & Coal Co. lighted its Holt, Ala., stack, Oct. 28.

The Jones & Laughlin Steel Co. blew out Aliquippa No. 1 stack on Oct. 29, for repairs.

The Cambria Steel Co. blew out three stacks; No. 6 on Oct. 22, No. 1 on Oct. 23 and No. 4 on Oct. 28.

NEW SWEDISH ORE BOAT BRINGS IN CARGO.

The Sir Ernest Cassel, a large new steel vessel built especially for the Swedish iron ore traffic, and with special reference to the trans-Atlantic transportation of this ore to the United States, reached Philadelphia the past week on its maiden trip from Narvik, Norway, to this country. The ship is equipped with all the modern machinery for the rapid loading and discharging of ore and it is capable of accomplishing some extremely creditable records along this line. The cargo brought over on this trip consists of about 11,000 tons of Swedish ore consigned to eastern Pennsylvania blast furnaces. In coming up the Delaware river to the Port Richmond docks, the Sir Ernest Cassel collided with another vessel coming down the river and suffered some damage which will detain the boat on this side for a few days before its return trip.

BIRMINGHAM NEWS NOTES.

Birmingham, Nov. 1.

Cecil Grenfell left today for New York, where he will probably confer with the board of directors of the Southern Iron & Coal Co. in the matter of appointing a president to succeed Mr. Hassenger. Mr. Grenfell has been in the district for the past week going over the properties of the company. He will sail for England within the next few days.

On Tuesday and Wednesday of this week the rail committee of the American Railway Engineering and Maintenance Association will hold a meeting at the Hillman hotel. While in the city the party will be the guest of the Tennessee Coal, Iron & Railway Co., and be shown over the steel mills at Ensley.

Karl Schneider, H. Schubert and M. Bohlan, members of a prominent German steel company, paid a visit to Birmingham last week, and while here were shown over the steel plant and new construction work being carried on by the Tennessee company.

Copper exports for October were 27,512 tons, against 23,876 tons in 1909, and 21,962 tons in 1908. Since Jan. 1, to date, 237,610 tons, as compared with 250,398 tons in 1909, and 249,001 tons in October, 1908.

RAIL ORDERS

Will be Taken on New Basis—Books Open for Next Year.

The Lackawanna Steel Co. has opened its books for 1911 rail orders, and in connection therewith has announced a new basis for quoting rails for domestic use, making prices by the 100 pounds unit instead of by the gross ton, as heretofore. This method of quoting makes standard Bessemer rails $1.25 per 100 pounds at mill and standard open-hearth rails $1.34 per 100 pounds at mill, and in this respect harmonizes the rail product with other finished iron and steel lines which have long been upon a 100-pound basis. The arrangement is made from a standpoint of mill convenience and it removes rails from the list of semi-finished and crude products, which are always quoted on a gross ton basis, and includes them where they rightfully belong, as a finished product. The new method effects no change in the prices per gross ton of rails, $28, mill, for Bessemer and $30, mill, for open-hearth, which have long prevailed. The books of other leading rail makers for 1911 orders have also been opened and the method of quoting prices on a 100-pound unit basis, has been generally adopted. The negotiations for rails for next year's delivery now in progress, are expected to develop announcements of contracts very shortly.

HARBISON-WALKER IMPROVEMENTS.

The Harbison-Walker Refractories Co., Pittsburg, has announced plans for improvements at its Wylam, Ala., plant to cost $100,000.. The improvements include an addition of 100 feet to the main building and the installation of two extra pans and six extra kilns, with a corresponding increase for additional drier capacity and stock rooms. The capacity of the plant will be increased from 35,000 to 75,000 fire brick. The company expects to have the improvements completed shortly after the first of the year.

ST. LOUIS SHIPMENTS.

Receipts and shipments of pig lead and spelter at St. Louis for the last two weeks were as follows:

	Zinc and spelter	Pigs of lead.
Receipts:—		
For week ending Oct. 22.....	98,670	49,120
For week ending Oct. 29.....	84,750	66,970
Shipments:—		
For week ending Oct. 22.....	90,550	26,800
For week ending Oct. 29.....	99,970	24,960

ORE CARRYING SLUMP.

This Year Has Rarely Been Equalled.

The week in lake circles opened very quietly. Some of the wild carriers are now coming down from the head of the lakes light, being unable to get cargoes. In fact, there has rarely been such a drastic slump in the ore trade as has marked this fall's business. There is absolutely nothing in it for outsiders. Charters have been made for practically all the grain that will be moved and little business will be offering in this trade during the remainder of the season. In fact it is predicted that lake trade will be brought rapidly to a close after Nov. 10.

No information has been received during the past three or four days from the Moreland. She will prove a very expensive wreck, as practically all of her ore cargo of 10,000 tons has been jettisoned and, moreover, her injuries are quite extensive.

The steamer Republic of the Hanna fleet went ashore in Buffalo harbor on Saturday, but was released without much damage.

LACKAWANNA STEEL TO RAISE THE MAINE.

Buffalo, Nov. 1.

An unusual shipment of sheet steel piling will leave the plant of the Lackawanna Steel Co. this week for Philadelphia, en route for Havana, where it will be used for building the cofferdam necessary for raising the battleship Maine. The contract is for 5,000 tons and the first shipment will fill 45 cars. Each car as it goes through the country will bear a sign proclaiming the fact that it carries steel to be used in raising the Maine.

The award of the contract to the Lackawanna Steel Co. follows the successful use of the piling in building the cofferdam for the immense ship canal lock which is in course of construction at Buffalo.

Will Form Local Branch.—At a meeting of the foundry foreman and superintendents of Buffalo and vicinity, held in the rooms of the Buffalo Employers' Association, Buffalo, Wednesday, Oct. 26, preliminary arrangements were made for the organization of a local branch of the Associated Foundry Foremen. Robert B. Thomson, president of this society, presided, and in his opening remarks pointed out the educational advantages to be derived from an organization of this kind. W. M. Corse, secretary of the Brass Founders' Association, gave an account of the association work in Detroit and former President McQuillan, of the Associated Foundry Foremen, briefly outlined the work of the New York City branch. J. R. Battenfeldt, of the Berkshire Mfg. Co., Cleveland, attended the meeting and gave an interesting talk on foundry conditions in Europe. A committee was appointed to nominate officers and the organization of the local will be effected at the next meeting in November.

WILL EXPLOIT INGOT IRON PRODUCTS.

The Pittsburg Metal Products Co., 1639 Oliver building, Pittsburg, has been organized for the purpose of exploiting products made from American ingot iron, 99.94 per cent pure. This concern has been licensed by the International Metal Products Co., Middletown, O., to take over the manufacture and sale of American ingot iron products, such as plates from No. 9 gage to 11-16 inch in thickness, inclusive, up to 84 inches wide and 25 feet long. Other products include lap welded boiler tubes, welded pipe, casing, line pipe and certain sizes of sheets. This ingot iron possesses peculiar properties for resisting rust, acids, sulphur and other corrosive agents and its use is particularly advantageous in the construction of tanks, boilers and for other work where the resistance to rust, acids, sulphur and other corrosive agents is essential. The officers of the new company are Harry E. Sheldon, president, and W. Lester Walker, secretary and treasurer.

PREPARING TO OPERATE.

The new plant of the Erie Engine Works, Erie, Pa., will be placed in operation some time this month. The main building is 155 x 400 feet, the pattern shop 50 x 80 feet and the pattern storage building 55 x 200 feet. The buildings are of steel, frame and brick construction with cement tile roofs. The company manufactures portable and stationary engines and boilers, and has a large number of orders on hand.

WELSH TIN PLATE TRADE.

Swansea harbor trust returns for the week ending Oct. 15, with comparisons, follow:

	Week of Oct. 15. Boxes.	Previous week. Boxes.	Corresponding week last year. Boxes.
Received	103,137	101,590	103,020
Shipped	62,320	90,760	112,664
Stocks	201,390	160,573	120,155

ALLIS-CHALMERS REPORT

For Year Ending June 30, Shows Net Earnings $495,732.

The report of the Allis-Chalmers Co. for the fiscal year ending June 30 last shows net profits amounting to $495,732.40, compared with $135,431.75 for the preceding year. First mortgage bonds outstanding remain at $11,148,000, but the treasury bonds have been increased by the addition of $563,000 par value. In view of the fact that the company operated its various plants at less than 60 per cent of capacity over the latter part of the fiscal year, it is believed that the financial showing will be very satisfactory to stockholders. The following analysis of the company's statement is made by President Walter H. Whiteside:

The total earnings of your company for the fiscal year ending June 30, 1910, after deducting the cost of manufacturing, selling, taxes, insurance, development, redesigning, and other general expenses, also dividends on preferred stock of the Bullock Electric Manufacturing Co. and making adequate provisions for doubtful accounts, were $2,576,818.55.

Less:

Expenditures for maintenance, repairs and renewals on buildings, machinery, plant, tools, etc.	$ 987,419.61
Reserves for depreciation on buildings, plant, tools, etc.	381,247.56
Interest on bonds, loans and notes payable	712,418.98
	$2,081,086.15
Net earning for the year	$ 495,732.40

In an industry like that of your company, which is largely the manufacture of heavy machinery requiring time to build, erect, and test to completion, the results of each year must depend to a degree upon the previous year's demand. As noted in our eighth annual report, business booked began to improve during the latter half of the fiscal year ending June 30, 1909, and this improvement has continued during the past year, the sales invoiced and orders booked being, respectively, 29½ per cent and 40 per cent in excess of the previous period. Of the sales invoiced for the year about 55 per cent was for new lines of business, which the company has recently developed, and of these new lines about 75 per cent was electrical.

The unsettled conditions which have disappointed the expectations expressed in our eighth annual report, still obtain, but your company is now better able to cope with them, due to readjustments and improvements in methods made possible by important additions to its West Allis works. While the duration of the present general depression can not be foretold with certainty, the inquiries and negotiations in hand justify the hope that business will soon regain greater steadiness to the end that uniform bookings may obtain to the full capacity of your present plants.

Personal.

Edwin F. Atkins, of Boston, who was elected president of the Westinghouse Electric & Mfg. Co., in June, to succeed Geo. Westinghouse, is inspecting the Westinghouse plant this week.

George E. Day, secretary and general manager of sales of the Youngstown Sheet & Tube Co., Youngstown, O., accompanied by Mrs. Day, left Tuesday, Oct. 25, for California, to spend the winter.

John W. Craig, for eight years superintendent of the nail mill of the Pueblo, Colo., plant of the Colorado Fuel & Iron Co., has resigned to accept a position with the Vulcan Iron Co., San Francisco.

Alfred Craven has been appointed engineer in charge of the subway construction by the public service commission of New York City, succeeding Geo. S. Rice, resigned, who was a deputy engineer under his predecessor.

R. B. Farquhar Jr. has been chosen general manager of the Keystone Steel Casting Co., Chester, Pa., succeeding D. C. Egan, resigned. Mr. Farquhar was for some years in the employ of the Taylor Iron & Steel Co.

A. E. Domville, superintendent of foundries of the American Car & Foundry Co., Berwick, Pa., has resigned, and after Dec. 1 will be affiliated with the Nevius Castings Co., Philadelphia, in which he has purchased a large interest.

William Vollner, who has been assistant superintendent of the Baldwin Locomotive Works, has been appointed superintendent of the Standard Steel Works, at Burnham, Pa., succeeding John P. Sykes, who has been assigned as assistant general superintendent at the Baldwin works.

T. R. McDonald, who for the past 11 years has been identified with the Casey Hedges Co., at New Orleans, has been transferred to Cincinnati as manager of the branch in that city. This concern deals in water tube, standard and marine boilers, has recently built a new shop at Chattanooga, and is rapidly expanding its territory.

Seward Babbitt, for a number of years sales manager of the gas engine department of the Power & Mining Machinery Co., Milwaukee, and the Snow Steam Pump Works, Buffalo, has resigned his position and returns to The William Tod Co., of Youngstown, O., a company with which he was formerly connected.

The Chicago, Burlington & Quincy railroad has placed an order with the American Car & Foundry Co. for the construction of six postal cars. An unusual feature is that they are to be built entirely of steel. They are 40 feet long, somewhat below the standard size. The cars are to be built at the Jeffersonville, Ind., plant of the company.

COMPLETING ADDITION TO CRANE-ERECTING SHOPS.

The Northern Engineering Works, Detroit, Mich., builder of cranes, is completing an addition to its crane erecting shop, 60 x 100 feet, steel and brick construction, with steel window sashes. Three cranes and two overhead trolley runs will serve the floor, and electric and pneumatic hoists will be used. The machinery equipment has been installed, and it is planned to occupy the building this month. A new storage yard for structural steel has been laid out alongside the addition, and is served by a 60-foot span three-motor electric Northern gantry crane of special construction. The company reports the largest demand for its electric Northern cranes and other products in its history.

READY TO MOVE INTO NEW SHOPS.

The Rockford Machine Tool Co., Rockford, Ill., although just recently incorporated with a capital stock of $50,000, is about ready to move into its new shops. The building is 60 x 120 feet, and is located at Harrison avenue and Eleventh street. Its machinery equipment has been purchased. It will principally manufacture 15-inch engine lathes, an up-to-date tool in every particular.

DEATH OF PROF. ROBINSON.

Stillman W. Robinson, professor emeritus of mechanical engineering at Ohio State University, a successful educator and inventor, died unexpectedly of heart failure at his home in Columbus, Oct. 31. Prof. Robinson founded the first mechanical engineering department in an American university, this being at the University of Illinois. Previous to that, he had been connected with the engineering faculty of the University of Michigan. It was in 1879 that he went to Ohio State University, and there he was engaged in instruction until 1895. From 1880 to 1884, Dr. Robinson was inspector of Ohio railroads, and from 1883 to 1884 he was consulting engineer of the Santa Fe railroad.

The best known of Dr. Robinson's inventions was a device for pegging shoes with metal pegs, which greatly simplified and cheapened shoe making processes. This invention was the foundation of the United Shoe Machine Corporation. Another of his inventions was the invention of a metal composition to resist the action of salt water. All the piles which the government used in the harbor work at Manila were prepared after his specification. A right angle transmission without the intervention of bolts, pulleys or bevel gears, a machine for grinding lenses, a measuring device for determining the flow of gas and oil at the well, and many other devices are included in Dr. Robinson's inventions. He had a very comfortable fortune, from which he had given liberally to the cause of education, particularly for equipment of the department at Ohio State University, over which he so long presided.

Obituary.

Charles A. D. Lynch, aged 67, formerly a boiler manufacturer of Corry and Harrisville, Pa., and later of Kokomo, Ind., died last week at his home in Grafton, Pa., near Pittsburg.

Robert Smith, for years foreman of the Detroit Shipbuilding Co.'s foundry, died Oct. 23, aged 54. Recently he organized the Smith & Mathews Foundry Co., Detroit, of which he was president at the time of his death.

Louis C. Taylor, purchasing agent for the John A. Roebling's Sons Co., died Oct. 27, at his home in Trenton, N. J., after an illness of two weeks. He was well known to the iron and steel trade throughout the country. Mr. Taylor was identified with semi-business clubs and other organizations in New York, Philadelphia and other places. He was 45 years of age.

John Harlen, founder of the McNab & Harlen Mfg. Co., of New York City and Paterson, N. J., manufacturer of valves and plumbing supplies, died at his home in New York City, Oct. 28, after an illness dating over several years. He was born in Ireland and started in business in New York about 50 years ago. He was a pioneer in the steam valve business and was the inventor of several appliances in this line.

Lynde Belknap, treasurer of the Otis Elevator Co., died suddenly at New York, Oct. 27. He was found dead upon the floor of his office, having fallen from his desk after being stricken by a sudden attack of acute indigestion. He had been suffering from this ailment for the past two months. Mr. Belknap was president and director of the Sundh Electric Co., and treasurer and director of the Sultan Motor Co. He joined the Otis Elevator Co. 25 years ago and upon its incorporation became treasurer. He was 50 years of age.

IRON AND STEEL SECURITIES

Last week the New York stock market's chief feature was irregularity. Prices gained little ground; nevertheless some stocks established high records for the present movement. Liquidating sales brought about occasional reactions.

Monday stocks opened strong under the leadership of Steel common, but later, under the same leadership, sold off and closed weak; cotton closed at lowest prices; grain markets firmer. Tuesday's market was less active, closing weak and lower; cotton advanced $3 a bale; grain slightly higher. Wednesday stocks were active and irregular; English consols went to 78¾, lowest price in half a century, but recovered to 79 1-16. Thursday the market was firm and higher, Steel common advancing to 80. Friday trading was less active; foreign security markets slightly firmer. Saturday, stocks closed weak and lower after a dull day.

Call money was nominally 3 per cent but ranged from 2½ to 4 per cent. Time money was inactive until late in the week when a sudden demand proved the supply smaller than was estimated. Actual figures of clearing house banks showed loans, decrease $4,538,700; deposits, decreased $7,414,700; reserve, decreased $2,881,000; surplus, decreased $1,027,325; and the percentage of reserve 25.8, compared with 25.9 the week previous. Non-member banks and trust companies showed loans, decreased $1,272,900; net deposits, decreased $4,853,900; and the percentage of reserve 17.3 against 17.4. Bank clearings were lighter and were 10¾ per cent below last year. Commercial failures for the week were 257, against 205 the preceding week, and 211 the corresponding week last year. Shares were sold to the number of 3,379,000, against 3,563,600 the preceding week, and 4,751,300 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $11,808,000 against $16,040,000 the preceding week, and $19,297,000 the corresponding week last year.

	Closing Quo. Oct. 29	Changes in week.	Annual Meeting Date 1910	Stock Outstanding	Basis	Dividend Last Dividend	Dividend Date Last Div.	Dividend Pay.
Allis-Chalmers	10	— ¼		$19,820,000				
Allis-Chalmers, pr	34	+ ½		16,150,000	7 cum	1¾ Q.	Feb.,	1904
American Can	9⅝	+ ⅝	Feb. 2	41,233,300		1¾ Q.		
American Can, pr	75½	+4½		41,233,300	7 cum.	1¾ Q.	July,	1910
Am. Car & Fdy	53⅞	—1⅜	June 24	30,000,000		½ Q.	Oct.,	1910
Am. Car & Fdy., pr	114	—1		30,000,000	7 n. c.	1¾ Q.	Oct.,	1910
American Loc	40½	— ½	Oct. 18	25,000,000	5	1¼ Q.	Aug.,	1908
American Loc, pr	106⅛	+ ⅛		25,000,000	7 cum.	1¾ Q.	Oct.,	1910
American Ship	79	.....	Oct. 12	7,600,000	4	1 Q.	Sept.,	1910
American Ship, pr	109	+1		7,900,000	7 cum.	1¾ Q.	Oct.,	1910
Am. Steel Foundries(new)	49½	+1	Dec. 1	17,184,000		1¼ Q.	Nov.,	1910
Barney & Smith	25	.....	June 7	2,000,000	4	1 Q.	Dec.,	1910
Barney & Smith, pr	95	.....		2,500,000	8 cum.	2 Q.	June,	1908
Bethlehem Steel	32½	—1½	April 5	14,862,000				
Bethlehem Steel, pr	61	—1⅞		14,908,000	7 n. c.	¾ Q.	Feb.,	1907
Cambria Steel	44⅝	.....	Mar. 15	45,000,000	5	1½ Q.	Nov.,	1910
Cambria Iron	45	.....		8,468,000*	4	2 S. A.	Oct.,	1910
Chicago Pneumatic Tool	40	—2	Feb. 21	6,485,800	4	1 Q.	Oct.,	1910
Colorado Fuel	34	— ⅝	Oct. 17	34,235,500		1¾ Q.	Apr.,	1902
Crucible Steel	12⅞	—¾	Oct. 19	24,578,400		3½.		
Crucible Steel, pr	78¼	—1¾		24,436,500	7 cum.	1¾ Q.	Sept.,	1910
Empire Steel	10	.....	Feb. 23	1,254,770				
Empire Steel, pr	55	.....		2,500,000	6 cum.	3 S. A.	July,	1910
Fay & Egan	70	.....	Feb. 15	1,000,000	6	3 S. A.	Feb.,	1909
Fay & Egan, pr	115	.....		1,000,000	7 cum.	1¾ Q.	Sept.,	1910
General Electric	155¼	+1⅛	May 10	65,179,600	8	2 Q.	Oct.,	1910
Harbison-Walker	32	.....	Jan. 17	18,000,000		½ Q.	Aug.,	1910
Harbison-Walker, pr	93	.....		9,600,000	6 cum.	1½.	Oct.,	1910
International Pump	43½	— ¼	May 10	17,762,500		1 Q.	Nov.,	1910
International Pump, pr	82⅞	—1⅛		11,350,000	6 cum.	1½ Q.	Aug.,	1910
Lackawanna Steel	40	+ ¾	Mar. 9	34,978,000				
Lake Sup. Corp	26	+1¾	Oct. 5	40,000,000				
New York Air Brake	79	+ ½	June 16	10,000,000	8	1½ Q.	Oct.,	1910
Niles-Bement-Pond	98	.....	Feb. 2	8,500,000	6	1½ Q.	Sept.,	1910
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	Aug.,	1910
Otis Elevator Co	48	+2	Mar. 21	6,375,000	3	1½ S. A.	Oct.,	1910
Otis Elevator Co, pr	93	.....		6,310,000	6 n. c.	1½ Q.	Oct.,	1910
Pa. Steel	60	.....	May 9	10,750,000				
Pa. Steel, pr	106½	+3½		16,500,000	7 n. c.	3½ S. A.	Nov.,	1910
Pittsburg Coal Co	20	—1	Mar. 8	28,104,600				
Pittsburg Coal Co., pr	71¼	+ ¼		27,071,800	7 cum.	1¾ Q.	Oct.,	1910
Pressed Steel Car	34¾	— ¾	Feb. 16	12,500,000		1 Q.	Aug.,	1904
Pressed Steel Car, pr	96¾	+ ¾		12,500,000	7 n. c.	1¾ Q.	Nov.,	1910
Pullman	169	+4½	Nov. 9	120,000,000	8	2 Q.	Nov.,	1910
Railway Stl. Spring	35¼	— ¼	Mar. 3	13,500,000	2	1 S. A.	Oct.,	1908
Railway Stl. Spring, pr	93¾	.....		13,500,000	7 cum.	1¾ Q.	Sept.,	1910
Rep. Iron & Steel	34	— ¾	Oct. 19	27,191,000				
Rep. Iron & Steel, pr	98	+1¾		25,000,000	7 cum.	1¾ Q.	Oct.,	1910
Sloss-Sheffield	52	+ ½	Mar. 9	10,000,000	5	1¼ Q.	Sept.,	1910
Sloss-Sheffield, pr	114½	.....		6,700,000	7 n. c.	1¾ Q.	Oct.,	1910
U. S. Pipe & Fdy. Co	18	— ¼	June 22	12,106,300	2	1 Q.	Dec.,	1910
U. S. Pipe & Fdy.Co.,pr	60	.....		12,106,300	7 n. c.	1¼ Q.	Sept.,	1910
U. S. Steel	78¼	—1¼	April 18	508,302,500	5	1¼ Q.	Dec.,	1910
U. S. Steel, pr	119⅞	.....		360,281,100	7 cum.	1¾ Q.	Nov.,	1910
U. S. Steel 5s	103¾	— ¼		463,798,000	5			
Va. Iron, Coal & Coke	54	—1	Sept. 20	9,073,680		5. †	Oct.,	1907
Westinghouse Elec	73¾	+ ½	July 27	3,998,700*		10½ Q.**	Oct.,	1910
Westinghouse Air Brake	142½	— ½	Oct. 4	13,750,000*		5 Q. ‡	Oct.,	1910

Par value of shares, $100, except those starred (*), $50.
**Includes 8¾ per cent on back dividends.
†Stock.
‡Includes 1½ extra and 1 special.

Copper Stocks.

New York. — Amalgamated Copper closed 69, a net loss of 2⅛.

Boston.—Butte Coalition closed 20, no change; Calumet & Arizona closed 59¼, a net loss of ⅝; Calumet & Hecla closed 560, no change; North Butte closed 33¾, a net gain of ½; Quincy Mining closed 77, no change.

Financial Notes.

Pennsylvania Steel Co. has declared the regular semi-annual dividend of 3½ per cent on preferred stock, payable Nov. 1.

The Pressed Steel Car Co. has declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable Nov. 23.

The J. G Brill Co., Philadelphia, has declared a quarterly dividend of 1¾ per cent on the preferred stock, payable Nov. 1.

Butte Coalition Mining Co. has declared the regular quarterly dividend of 25 cents a share, payable Dec. 1.

The International Harvester Co. has declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable Dec. 1.

The National Carbon Co. has declared the regular quarterly preferred dividend of 1¾ per cent, payable Nov. 15.

The Amalgamated Copper Co. has declared the regular quarterly dividend of 50 cents a share, payable Nov. 28.

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January, 1910	5,681
February	5,703
March	5,754
April	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955

November 3, 1910

GETTING ON A HIGHER PLANE

No event in the history of the iron trade has been so significant of its progress toward a higher standard of business as was the recent meeting of the American Iron and Steel Institute. We have already referred to the statesman-like presidential address of Judge Gary. On an equally high plane was the paper of Mr. Farrell, president of the United States Steel Products Co., who emphasized, so far as our country's foreign relations are concerned, the principles which Judge Gary so ably applied to both domestic and foreign relations. If it is not too much to hope for the day when the bloody wars between nations shall be no more, it is not unreasonable to believe that even at an earlier date there will be no semblance of commercial warfare between the nations. Such men as Mr. Farrell have had powerful influence in abolishing the once popular "dumping" policy of the nations.

The able address of Willis L. King, vice president of the Jones & Laughlin Steel Co., respecting the sacredness of contracts, was a most impressive presentation of an important subject. He pointed out most clearly that any temporizing with a principle so vital as the inviolability of a contract must inevitably result in a lowering of the moral tone of an industry, and cause great loss and uncertainty in its operation.

The address of Mr. Dickson, first vice president of the United States Steel Corporation, was noteworthy for the courageous declaration of belief in progressive policies, and for the statement of most encouraging facts, showing that genuine progress is being made in the betterment of conditions in the iron and steel industry. When one company is willing to spend, and is spending, $400,000 a year for the promotion of the health and safety of its employes, and when it has established a fund of $8,000,000 for pension purposes; when a committee has been appointed to work out the details of the abolition of seven day work, and when a vast amount of time and money is being spent in studying the social welfare of the employes, it is clear that substantial progress is being made in the right direction. The mere fact that a man of Mr. Dickson's prominence asserts that judicial procedure in this country must be simplified before equality of rights for the rich and the poor becomes a reality, that he expresses his belief that compensation to injured workmen is a legitimate charge against the cost of manufacturing, and that the victim of an industrial accident should receive compensation, not as an act of grace on the part of the employer, but as a right, is proof of the fair mindedness and love of justice which must help in bringing about better relations between the employer and employe.

Of course, there will be those who will question whether the Institute can carry out its ideas along practical lines. *Engineering News* in discussing Judge Gary's address, says:

> It sounds beautifully to say that all prices should be fair and reasonable; but what are fair and reasonable prices for finished iron and steel? Will the same standard apply that has been established for public utility companies? Fair and reasonable railway rates for example are such as pay the cost of running the railway and leave a fair rate of return on the capital actually invested. Suppose the Steel Corporation were to adopt the same standard and fix such prices for iron and steel as would pay the cost of production plus a fair rate of profit on the capital actually invested in its mills and mines and furnaces, or, in other words, the cost of replacing its present plant. We doubt whether such a proposition would be exactly pleasing to the stockholders in Mr. Gary's huge corporation.

We believe that the *News* has correctly stated the standard which should be employed in determining prices, and that this standard will be satisfactory to the far minded stockholders in the Corporation. But whether it is satisfactory to the stockholders or not, it is the standard upon which an enlightened public conscience will insist. With the ruinous competition of the past, the owners of iron and steel plants felt that in prosperous times they were entitled to tremendous profits, but if such senseless competition can be checked, as has been done during the past few years, manufacturers will be content never to receive the great profits which sometimes were realized in the old days.

It will, of course, be necessary to adopt practical methods of carrying out the great principles which have been annunciated. The Institute has been rather slow in getting to work, and there has been some doubt as to what its field of activity would be. Its purposes are now, however, much more clearly defined. It is not aiming so much for leadership in solving engineering problems and introducing new methods of manufacture, as it is in improving commercial methods. If it keeps abreast of the progressive sentiment of the times in favor of

publicity, and earns the good will of the press of the nation, the possibility of its usefulness will be very great.

THE COKE PROBLEM.

The problem of the Connellsville coke operator is a more serious one than the operator himself probably realizes. He has heard so often that Connellsville coke is the ideal blast furnace fuel, and has by repetition so familiarized himself with the statement, that he pays little attention to the progress in coke and pig iron making, whereby the relations have been altogether changed. In the first place, the blast furnace manager depends much more upon management, and much less upon the use of very good raw material, for the production of good results than was the case years ago when the reputation of Connellsville coke was made, while in the second place, by-product coke has become a very strong competitor by reason of the very low cost of production when the value of the by-products is considered.

In the past, the Connellsville coke market has fluctuated violently and the operator has depended upon the profits in flush times to make him a good average, but there are not likely to be any of these in the future. The last boom in coke did the industry more harm than good. Before the beginning of the second half of last year, contracts for that period could be made at $1.60. A few months later, in October and November, the question in the mind of the operator was whether he would accept $3.00 for this year or hold out for a still higher figure. In the past few months, coke has been selling at $1.60 again, and even $1.55 is being quoted. Compared with the "dollar coke" of several years in the 80's and early 90's, $1.60 coke is high, but through changed conditions, $1.60 is low compared with costs, and high compared with by-product coke. To many Connellsville operations, a continuance of the $1.60 price means ruin, yet there is no promise in existing conditions of any important advance over this price in the next few years. When this country was making 31,000,000 tons of pig iron a year, the Connellsville region was producing an average of 450,000 tons of coke a week, while it has shown that it can do 475,000 tons, and it can probably do 500,000 tons. With the country producing 25,000,000 tons a year, in the past three months, the Connellsville region has been producing not over 350,000 tons of coke weekly, even though that coke could be bought at $1.60. So much for the prospect of increased prices through increased demand. As to an advance by artificial arrangement, the ultimate effect would merely be to give further encouragement to the by-product system, which is already gaining ground apace.

As intimated before, a continued price of $1.60 means ruin to many Connellsville operations. There are those, of course, which have paid for their coal, whatever it may have cost, and need have regard only for current manufacturing cost and depreciation of plant. They can figure a profit when selling at much less than $1.60. At the other extreme are operations which have paid very high prices for their land. An intermediate case may be taken of an ordinary operation with the coal carried at $1,000 an acre. A fair operation is based upon 25 years' life, which means approximately two acres per oven, the yield being 6,000 to 7,000 tons of coke per acre and the reasonable expectancy as to continuity of operation not promising much over 500 tons annually per oven. The investment per oven is then approximately $2,000 for the coal and $2,000 for the oven, mine development, etc., a total of $4,000 per oven. The bare cost of producing coke, with the present wage rates, averages about $1.25 per ton. Interest on $4,000 at 6 per cent is $240. To return one-twenty-fifth of the principal annually means $160. This is a conservative method, although no more so than should be followed in such an enterprise. To establish a sinking fund, which should bear interest, would require a much smaller annual contribution to amount to $4,000 at the end of 25 years, but this would not be safe. Appropriating one-twenty-fifth each year entails a reduction year by year in the interest charge upon the investment, which is as it should be.

At $400 of interest, exhaustion and depreciation charges for each 500 tons of coke, there is 80 cents per ton, which added to $1.25 gives $2.05 as the requisite selling price to pay 6 per cent on the investment. With practically no allowance at all for depreciation and exhaustion, the cost would still be $1.75.

The cost of making coke in the Connellsville region promises to advance so far as wages are concerned. The region is now paying for mining only 10 cents per 100 bushels more than 10 years ago, or from 7 to 8 per cent, although in the decade wages generally, and particularly in coal mining, have suffered a very large advance. The present rate is about 35 cents per ton, approximately one-half the mine-run rate in the adjacent organized districts. It is improbable that such a condition will continue. The coal mining industry is tending toward a position of universal unionization, through the conduct by the union year by year of special contests in one field or another, these contests being frequently, if not invariably, aided by the operators in competing districts. When the influence of advancing wage rates extends to the Connellsville region, the position of the average Connellsville operator, already untenable for any length of time, will be made still worse.

A testimonial dinner to John Fritz, veteran steel master of the United States, will be tendered by the Manufacturers' Club, Philadelphia, on Nov. 7. The occasion will be seized upon to express appreciation for the advancement in the art of manufacturing iron and steel due to the initiative of Mr. Fritz. The honorary chairman of the committee of arrangements will be Andrew Carnegie, with Nathan T. Folwell as active chairman, the other members being Isaac Clothier, Charles M. Schwab, William E. Corey, Charles Kirchhoff and John Birkinbine.

The E. & G. Brooke Iron Co., Birdsboro, Pa., and the Phoenix Iron Works, Phoenixville, Pa., which jointly own the French Creek iron ore holdings in the northern part of Chester county, Pa., are drilling and otherwise sounding the working possibilities of these deposits. Upon the result of these investigations will depend whether operations in this property, which have not been carried on for some years, will be resumed. The ore of these mines is a magnetite and contains some copper. At one time this ore found considerable use in the mixtures of the blast furnaces of the locality.

BETTERMENT OF LABOR CONDITIONS IN THE STEEL INDUSTRY[1]

An Earnest Appeal for Equal Justice for Rich and Poor---Compensation for Workingmen for Injuries a Legitimate Charge Against Cost of Manufacture

"The encouraging sign of the times is that men who believe in better things, and who are in a position to give effective help in bringing them about, are now taking an active interest in these questions."

By William B. Dickson.[2]

No man who has had experience in the employment of large numbers of workmen, and least of all, iron and steel manufacturers, will be inclined to minimize the importance of maintaining such conditions of employment as will serve to keep the workmen contented with their lot.

When you take into account the small value of the raw material in the ground required to produce a ton of finished steel, i. e., the ore, coal and limestone, and compare this comparatively insignificant amount with the final total cost of production, you will realize the fact that the great difference is made up of the amounts paid for labor in the various processes from the mine to the consumer. The annual report of the United States Steel Corporation for 1909 shows this in a striking manner in the item of annual salaries and wages amounting to $151,663,394.00.

While it is true that the importance of the attitude of the wage earner toward his employer has always been recognized, it is only in recent years that the subject has been seriously viewed from any standpoint other than the wage rates, and that there has come a recognition on the part of the employer of what has been called a "social responsibility."

Much weight has been given, and properly, to the vast resources of ore, coal and stone which form the basis of our industry, and to the necessity for proper conservation of these materials. We are now beginning to place more emphasis than formerly on the human element, which, purely from the economic standpoint and aside from any altruistic motives, must be kept in condition for efficient work if we are to maintain our position in the world markets.

Dr. Eliot, of Harvard, says:—"Progress is measured by happiness, not by dollars and cents," and no nation can be really progressive unless the great body of its citizen workers are happy and contented.

As an old Carnegie man, you will pardon me if I cite as one of the first notably successful recognitions of the human element as a large factor in successful mill operation, the action of Mr. Carnegie, who made it possible for his mill superintendents and other practical operating men who had risen from the rank of ordinary workmen to become his partners. He is credited with having made the statement that if he had lost all of his other assets but had retained his splendid working organization, he could have speedily regained a dominant position in the steel industry. While due allowance must be made for some amiable exaggeration in this declaration, few men who have had any practical experience in the administration of large enterprises will be apt to minimize the importance of the attitude of the workmen to the employer. How best to weld his employes into a compact and efficient working force is a question constantly in the mind of every intelligent employer.

Prevention of Accidents.

The most striking instance of the aroused interest in the welfare of the workmen is shown in the effort and money which are being expended to safeguard the lives and health of the workmen. I can best illustrate this by a statement of what is being done by the subsidiary companies of the United States Steel Corporation.

These companies now employ about 50 men who devote all or a substantial part of their time to questions affecting the safety and health of employes. The officials in charge of this work estimate that a total expenditure of about $400,000.00 per year is now, and will continue to be, required for the maintenance of this organization and for providing safeguards and all sorts of safety devices. These range all the way from the protection of a set screw on a shaft, to the building of subways under tracks for use of workmen. For a statement in greater detail of methods and appliances for the prevention of accidents, you are referred to an article recently published in the *Survey* by David S. Beyer, chief safety inspector of the American Steel & Wire Co., from which I quote as follows:

This work is a logical outgrowth of association with the accidents which must inevitably accompany the use of machinery. It is probably safe to say that the "Casualty" or "Accident" department has always preceded the "Safety" department; that dealing with the men who have been injured has brought about a desire to prevent the recurrence of accidents. From the first scattering efforts in this direction, have grown more systematic methods until accident prevention has developed such a variety of detail and such breadth of possibilities, that it is fast becoming a technical branch of itself.

What was originally a species of self-defense, has broadened out into more humanitarian lines, until at present it is being taken up on a scale that would not have been dreamed of in this country a few years ago. Safeguards once considered entirely satisfactory are being replaced by others of improved construction. New forms of protection are constantly being devised.

In some of the companies which were brought together in 1901 to form the United States Steel Corporation, organized safety departments have existed for the last 15 years; in all of them more and more attention has been given to safeguarding employes, until at present each of the main subsidiary companies has a corps of train-

[1] An address delivered before the American Iron and Steel Institute, New York, Oct. 14, 1910.

[2] First vice president, United States Steel Corporation.

ed specialists who devote their time to studying the causes of accidents and to devising means to prevent them. New impetus was given this work by the interest manifested in it, and the policy adopted toward it by the officials of the Steel Corporation.

Every year all the men in charge of these matters for the several subsidiary companies have been called together at the general offices in New York for discussion of the problems connected with their work, the first general meeting being held in May, 1906.

At these meetings the officers of the Corporation have given assurances of support to the subsidiary companies in every practical undertaking for the prevention of accidents. This resulted in the formation in April, 1908, of a central committee of safety.

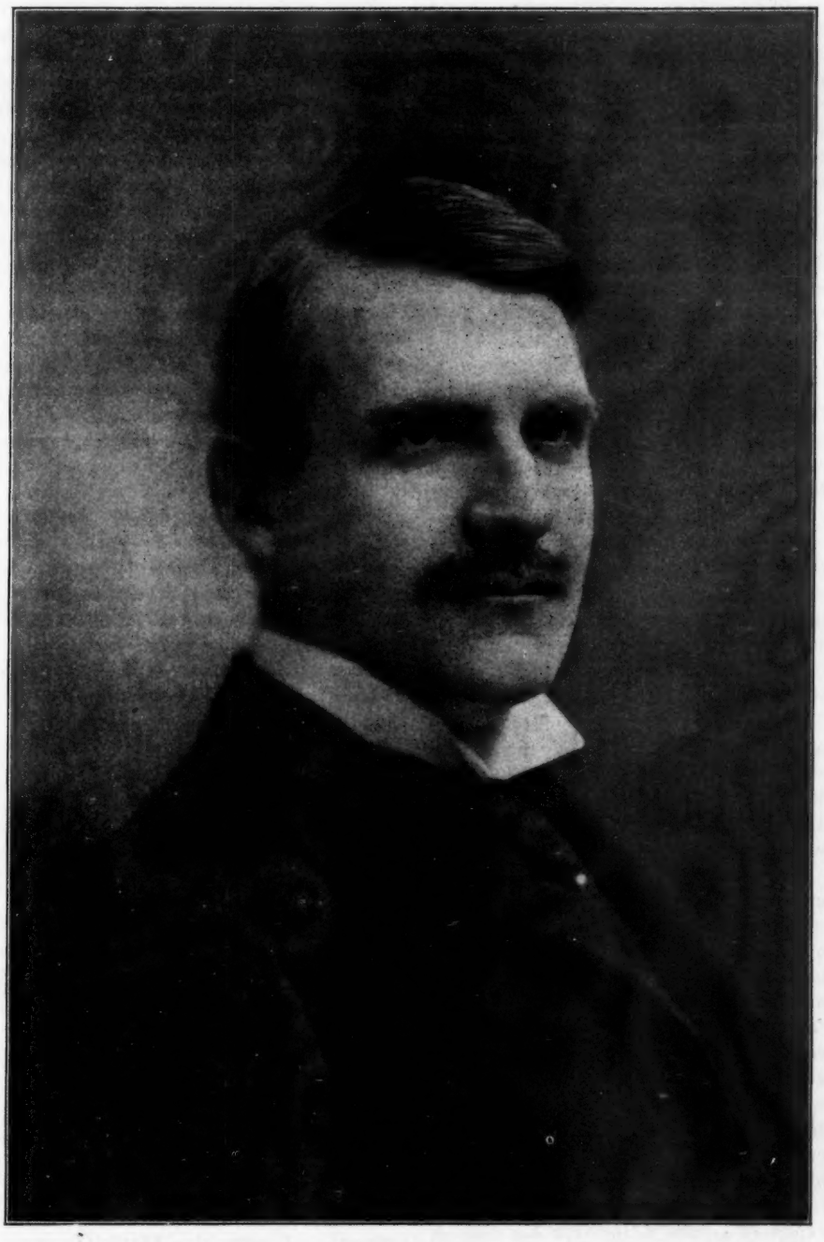
This committee is composed of five members representing subsidiary companies operating the largest plants and mills, with an officer of the United States Steel Corporation acting in an advisory capacity. It was empowered to appoint inspectors to examine the various plants and equipment, and submit reports of safety conditions, with suggestions for improvement.

The committee was further requested to record and disseminate data on regulations, rules, devices, etc., tending toward safer working conditions in the plants.

The committee has selected as its inspectors men already engaged in safety work in the subsidiary companies; in other words, the matter has resolved itself largely into a system of inter-company inspection, which gives the plants inspected the benefit of new view-point and varied experience, and at the same time enables the inspectors themselves to see what is being done elsewhere, and to carry back new ideas and devices to their own plants.

The plan has worked well and has been of great assistance to the several companies, who hitherto have been coping with their own safety problems without definite knowledge of what other members of the great Corporation family were doing.

Meetings of the committees are held about once a month, when arrangements for inspection are made, and reports considered. Drawings, photographs, rules, specifications, etc., are submitted for consideration and such as seen desirable are sent out to all companies.



Wm. B. Dickson,
First Vice President of the United States Steel Corporation.

Mr. Crawford, president of the Tennessee Coal, Iron & Railroad Co., has devoted much thought to safety and welfare work among his employes. He writes about an interesting development as follows:

One of the most important conveniences for the men is bath-houses, which have been installed at the ore mines. There are at present four in use and two are being constructed. They are centrally located at the different divisions on Red Mountain, are built of brick with concrete floors, separate lockers, and wash-rooms for whites and blacks. They are equipped with shower baths and wash-troughs and hot and cold water. They are heated by exhaust steam and are kept clean by attendants in charge night and day. A charge of 50 cents per month is made for the use of locker and baths. This makes it possible for the men to change their clothes before entering the mine, and on rainy days when they would get wet coming to work, they are able to enter the mine and go to work in dry garments.

Previous to the installations of these "Drys" many men failed to come to work on rainy days. This has not only been a comfort to them, but their health and efficiency have been greatly improved.

Where the question of patent rights is involved, our companies are properly jealous of any attempt on the part of our competitors to infringe, but in this movement to safeguard the lives and health of our workmen, we shall be glad to give everyone interested the benefit of our experience, and to aid in every possible way to attack this problem of accidents to workmen at the proper end, that is, by preventing them.

I am authorized by Judge Gary to invite your inspection of our methods and appliances. I have here for distribution a limited supply of booklets which have been issued by the various companies, and Mr. MacVeigh, the general counsel of the corporation,

and Mr. Bolling, his assistant, who supervise this work, will, I am sure, be glad to answer any questions, either verbally or by correspondence.

In connection with this subject it is interesting to note in the daily papers a statement to the effect that the sum of $50,000,000 will be expended by American railways in installing safety appliances on railway equipment under the rules recently adopted by the Interstate Commerce Commission.

Accident Relief.

In spite of every precaution, large numbers of accidents occur, involving temporary or permanent disability or death.

To meet this condition and secure some measure of uniformity in all the different departments, there has been devised a voluntary accident relief plan. This plan of relief is a purely voluntary provision made by the companies for the benefit of employes injured and the families of those killed in the service and constitutes no contract and confers no right of action. The entire amount of money required to carry out the plan will be provided by the company, with no contributions whatsoever from the employes.

The plan provides different compensation for temporary and permanent disablement, based on the nature of the injury, length of service, and number and age of dependents. The present plan is tentative only, but if it meets with success, it is hoped that some similar plan will be permanently adopted.

This question of workmen's compensation is receiving much attention; particularly in those states where large mining and manufacturing industries are located, and the party conventions are bringing it to the front as a political issue by inserting in their platforms planks demanding compulsory compensation laws.

New York and Ohio have within the past year, passed employers' liability laws, and in the state of Wisconsin, Massachusetts, Minnesota and New Jersey, commissions have recently been appointed by the legislatures to consider the subject of compensation for industrial injuries.

Under existing liability laws in the various states, only a small proportion of the workmen injured by accidents of their employment receive anything approaching adequate compensation. The fact that some employers do voluntarily pay their injured workmen, even where no legal liability exists, only emphasizes the present chaotic conditions. These conditions are bad enough, even if the questions arising under them were quickly adjusted, but the trouble is intensified and ill feeling engendered between workmen and employers by what is, in my judgment, the great shame of the American people, namely,—"The law's delay." In the majority of cases, the very essence of justice is the promptness with which it is administered, but by delays on technicalities, by retrials and appeals to higher courts, the man of limited means is placed at an immense disadvantage. To our shame we must admit that under such conditions the poor man and the rich man or corporation, are not "equal before the law."

I was interested in noticing the language of the oath of office which Mr. Hughes has just taken on his accession to the supreme bench. One clause reads—"I will * * * do equal rights to the poor and to the rich."

I believe that our independent legislative and judicial systems are the very bulwarks of our free institutions and I have no sympathy whatever with the recent wanton attacks on our courts. I would be the last to question the good faith and honesty of purpose of our judges. Nevertheless, the fact remains that judicial procedure in this country must be simplified before such a statement as is contained in this oath becomes a reality in practice.

President Taft has touched on no question more vital to our prosperity than this one of "the law's delay." We need an American Dickens to show forth in their true colors the workings of our circumlocution offices.

The practical certainty of long-drawn-out litigation and the remote prospect of a favorable verdict in many cases, owing to the operation of what many believe to be antiquated "fellow servant," "contributory negligence," and "assumption of risk" clauses in the various statutes have helped to foster another evil, namely, the so-called "ambulance chaser," who preys upon the credulity of the injured person and undertakes the prosecution of his suit for a contingent fee, often amounting to 50 per cent of the award. Other expenses usually reduce the net amount received to about 30 per cent.

There are great difficulties in the way of framing laws to meet these conditions. The statement has been made that "legislation is the final agency by which the law is brought into harmony with social needs." In other words, legislation, to be effective, must be the crystallization of public opinion.

But even if laws are enacted which reflect public opinion and meet the approval of a majority of employers and workmen they must run the gauntlet of the courts on the question of their constitutionality. In the event of an adverse decision, legislation must, of course, wait until the tide of public opinion has risen sufficiently to carry amendments to the federal and state constitutions.

Personally, I believe that compensation to injured workmen is a legitimate charge against the cost of manufacture and that the victim of an industrial accident or his dependents should receive compensation, not as an act of grace on the part of his employer but as a right.

The burden of industrial accidents now falls, in the most haphazard and unscientific manner, on the victim himself and his dependents, the benevolent employer, the sympathetic fellow workmen, or the public authorities, or on all of these.

I am inclined to believe that the solution will come eventually by the imposition of a tax on all employers based on the number of employes and the hazards naturally inherent in each industry. The proceeds of this tax should be used, first,—to perfect and extend the system of factory and mine inspection so as to prevent accidents and remedy unhealthful conditions of employment; and, second,—to provide an insurance fund from which payments can be made to the injured or their dependents.

How to bring about conditions which will accomplish this on a basis fair to all interests, is, however, a serious problem. My plea to the members of the Institute, most of whom are vitally interested in all of these questions, is to keep an open mind and not to forfeit their influence in shaping legislation by mistaking mere inertia for true conservatism.

United States Steel and Carnegie Pension Fund.

In addition to the accident relief plan, but entirely separate and apart from it in its administration, the United States Steel Corporation has established a fund of $8,000,000 for pension purposes, which, by agreement with Mr. Andrew Carnegie, will be consolidated with the $4,000,000 fund heretofore created by him. The aggregate amount will be known as the "United States Steel and Carnegie Pension Fund;" and the net proceeds will be administered by a board of twelve trustees for the benefit of employes of all subsidiary companies of the United States Steel Corporation. Eight of the trustees have been appointed by the corporation and four by Mr. Carnegie.

It is hoped that the details of ad-

ministration will be perfected so that the plan will become operative Jan. 1, 1911.

The average American workman does not take kindly to any form of paternalism.

There is a wide difference, however, between benevolent schemes which impose restrictions on the liberty of the employes and which may be granted or withheld at the whim of the employer, and such general plans as have been outlined, which so fundamentally affect the lives of the ordinary workmen. These are designed to take into account as a proper element in making up costs of manufacture, accidents to and deterioration of the human element, just as in the case of the inanimate machinery or equipment.

While the altruistic feature seems to be the most prominent, these plans really have a broader basis in the economic fact that the employer cannot reasonably hope to be permanently successful unless his workmen are also prosperous and therefore contented.

The Seven-Day Week.

In conclusion, I would like to emphasize again the importance of a question on which it was my privilege to present a paper to the Institute at the dinner following the annual meeting on May 27—namely, the seven-day week in the iron and steel trades. At that time I said:—

As you are aware, the United States Steel Corporation has recently taken some advanced steps in matters vitally affecting the relations between our various companies and their employes, namely—the reduction of seven-day labor to a minimum; the establishment of a system of accident and accidental death relief, and the establishment of a pension system.

In considering the first named, that is, the question of a seven-day week, we were, of course, met at the outset by the difficulty of adjusting a six-day week to the operations which are necessarily continuous and which are generally so recognized, even by the most radical opponents of the seven-day week. This refers particularly to such departments as the blast furnaces. The corporation has not yet been able to devise a practical working system by which the men employed at these continuous operations can be given one day in seven, and the purpose of this paper is to invite the co-operation of other companies operating blast furnaces, with a view to devising some workable plan.

It is my own deliberate judgment, after a period of almost 30 years continuous connection with the industry, the early part of which was passed in manual labor in the mills, that the present conditions which necessitate the employment of the same individual workman 12 hours a day for seven days a week are a reproach to our great industry, and should not in this enlightened age be longer tolerated.

In response to this appeal, a resolution was passed referring the matter to a committee of five to consider the subject and report later. I understand the chairman has appointed this committee, selecting as its members men who have had large practical experience in the handling of blast furnaces and steel works.

The following comments were made by the leading trade journals:

The Iron Age, June 2, 1910.

With full appreciation of the difficulties involved in the proposal thus put before the steel manufacturers of the country, it may safely be said that they are not insuperable. With their record for the solving of problems that have repeatedly blocked the advance of the industry, the engineers and managers who have done so much to put American steel works practice in the forefront, will not be willing to confess failure in advance, when thus challenged to bring about a much desired change. Ore unloaders, traveling cranes, charging machines for open hearth furnaces, automatic skip hoists, pig iron casting machines and the whole list of mechanical improvements that have been steadily cutting down the exhausting drudgery of iron and steel works operations, have been the response of engineers to the constant demand for new economies in production.

It will scarcely be claimed that the substitution of a six-day week for a seven-day week and the abolition of the 84-hour week in the iron industry are of less consequence than the ends served by any of the mechanical improvements mentioned.

The Iron Trade Review, June 9, 1910.

The question of Sunday labor is not necessarily a religious one at all. It is a well known fact that man is not so constituted that he can work year in and year out, seven days a week, for even less than twelve hours a day, and be much better than an animal.

There is no time for enjoyment, no time for self-improvement, no time for such intercourse with members of one's family. Work means degradation. Hard as these conditions are, the difficulties of abolishing them have been many, and have been due not merely to the dilatoriness of some manufacturers, but also to positive opposition of workingmen and labor unions, who fought against reducing the hours of labor if accompanied by a corresponding reduction of pay.

A single employer or number of employers could not reduce the working hours without reducing the pay, because the companies having the longer hours would be at a distinct advantage. It is not even possible for one part of the country to adopt the short hour system unless a similar policy is followed in other parts of the country. This has been clearly demonstrated in the case of San Francisco, where the adoption of the eight-hour day has proved ruinous to many industries, simply because they could not compete with other parts of the country, where the nine and ten hour systems prevail.

If this Sunday work is to be reduced to a minimum, it is extremely desirable that the largest number of employers possible be enlisted in the movement, and, for this reason, such an organization as the American Iron and Steel Institute promises to be could have very great influence in bringing about the proposed reform.

The report of the committee appointed by Chairman Gary to investigate the Sunday work question will be awaited with keen interest. It will be found impossible to abolish Sunday work entirely, especially in the case of the blast furnace, but, by increasing the number of employes, every man can be given one day off in seven as is done by seven-day newspapers to their employes.

President Taft has said:

The man who does not hope for better things and does not believe that better things can be brought about, is not the man likely to bring better things about.

The encouraging sign of the times is that men who believe in better things and who are in position to give effective help in bringing them about, are now taking an active interest in these questions.

The problems confronting us are not easy ones, but they certainly present less difficulties than those which have been surmounted, in other lines.

It is not to be expected that men who have been so conspicuously successful in the development of mechanical appliances and processes and in the administration of immense enterprises, will fail to solve these social problems when they are confronted with the absolute necessity for their solution.

WILL INVESTIGATE SUNDAY LABOR IN MILLS.

Pursuant to a resolution passed last May after hearing a paper before the American Iron and Steel Institute by William B. Dickson, first vice president of the United States Steel Corporation, in which he advocated the abolition of Sunday labor so far as was possible in the mills, President E. H. Gary, of the institute, has named this committee to investigate the subject and report: E. A. S. Clarke, president of the Lackawanna Steel Co.; W. B Schiller, president of the National Tube Co.; F. W. Wood, president of the Maryland Steel Co.; George G. Crawford, president of the Tennessee Coal, Iron & Railroad Co.; and James A. Campbell, president of the Youngstown Sheet & Tube Co.

OFFICES TRANSFERRED.

The Sharon Steel Hoop Co. has made arrangements to close its branch office in the Union National Bank building, Pittsburg, and has transferred its purchasing department to the general offices of the company at the Sharon, Pa., plant.

TOOL BUILDERS

Select Atlantic City for Next Meeting —Election of Officers.

Concluding what was the largest attended convention in the history of the organization, the National Machine Tool Builders' Association assembled at the Hotel Astor, New York City, selected Atlantic City as the place for the next meeting. The convention, which was attended by fully 175 machine tool builders, came to a close Wednesday, Oct. 26. Those present were the guests of the *American Machinist,* Wednesday evening, at a theater party at the New Amsterdam, and at the annual outing of machinery, Thursday, which consisted of a boat trip to an attractive Long Island Sound point, where luncheon was served and various out-door sports enjoyed.

In the election of officers, Frederick A. Geier, of the Cincinnati Milling Machine Co., Cincinnati, was re-elected president as a fitting appreciation of his efficient administration. The other officers chosen were: First vice president, C. H. Alvord, Hendee Machine Co., Torrington, Conn.; second vice president, S. H. Reck, Rockford Drilling Machine Co., Rockford, Ill.; treasurer, A. E. Norton, Prentice Bros. Co., Worcester, Mass.; secretary, Charles E. Hildreth, Worcester, Mass. Secretary Hildreth was given a rising vote of thanks as a testimonial of the faithful and beneficial service he had rendered the association during the past year.

A large number of new companies were admitted to membership in the association at the convention, including the following:

Acme Machine Tool Co., Cincinnati; Blanchard Machine Co., Cambridge, Mass.; J. G. Blount Co., Everett, Mass.; Cleveland Planer Works, Cleveland; Fay Machine Tool Co., Philadelphia; Frontier Iron Works, Buffalo; Gardner Machine Co., Beloit, Wis.; Gleason Works, Rochester; Grant & Wood Mfg. Co., Detroit; W. B. Knight Mfg. Co., St. Louis; Lapointe Machine Tool Co., Hudson, Mass.; Lea Equipment Co., New York City; Lees-Bradner Co., Cleveland; Morse Twist Drill & Machine Co., New Bedford, Mass.; National Machine Co., Hartford; Ransom Mfg. Co., Oshkosh, Wis.; Robbins Machine Co., Worcester, Mass.; Cincinnati Pulley Machine Co., Cincinnati; Milwaukee Machine Tool Co., Milwaukee; Wilmarth & Morman, Grand Rapids, Mich.; Putnam Machine Co., Fitchburg, Mass.; Bardons & Oliver, Cleveland; Willard Machine Tool Co., Cincinnati; Wood Turret Machine Co., Brazil, Ind ; Cleveland Automatic Machine Co., Cleveland; Sloan & Chace Mfg. Co., Newark, N. J.; Newton Machine Tool Works, Inc., Philadelphia.

DIVERSITY OF BIDS ON SOO CANAL LOCK GATES.

The lowest bid of eight filed for 118 tons of steel, etc., to be used for canal gates and other improvements in the St. Mary's canal, the Soo, which was widened last winter, was that of L. D. Weaning, of Cleveland, $9 593.54. The other bids were Milwaukee Bridge Co., $10,728.03; Detroit Bridge & Steel Works, $12.091.61; Penn Bridge Co., Beaver Falls, Pa., $14,335.10; George W. Jackson, Inc., Chicago, $15,985.09; New Jersey Foundry & Machine Co., New York, $17 943.43; Minneapolis Steel & Machinery Co., Minneapolis, $19,359.23; Whitehead & Kales Iron Works, Detroit, $21,884.06.

DECLARED FOR OPEN SHOP.

Robinson & Co., Richmond, Ind., manufacturers of farm implements, have declared for the open shop and several days ago the union molders in its employ struck. The company is quoted as declaring that while it is willing to employ union molders, but not as union men, yet it reserves the right to discharge incompetent men without regard to union dictation in any way.

DUNBAR STACK LIGHTED.

The Dunbar Furnace Co. lighted its No. 1 stack, Oct. 24, and is now blowing on foundry iron. No. 2 stack was blown out, Sept. 25, after making 301,000 tons on the one lining, running almost four years.

NEW YORK COPPER EXPORTS.

Copper exports for the week ending Oct. 27 were 6,484 tons, an increase of ,2,116 tons; from Oct. 1 to Oct. 27, 22,246 tons, an increase of 631 tons; from Jan. 1 to Oct. 27, 232,345 tons, a decrease of 15,792 tons.

The output of the Butte district for the month of October was 20,557,360 pounds of blister copper, as compared with 21,227,060 pounds in September, and 27,840,950 pounls in October, 1909.

The cupola of the Pasadena foundry, Los Angeles, Cal., was blown up late Oct. 27, with dynamite or some other high explosive.

CARS BOUGHT

By Lackawanna Largest Order For Some Time—Equipment Market.

The Delaware, Lackawanna & Western railroad has placed an order for 1,000 freight cars, which is the largest purchase of its kind to be made by any of the railroads for some time, and to that extent it is encouraging. Of the 1,000 cars, 500 steel underframe box cars and 250 all-steel hopper cars were taken by the Pressed Steel Car Co.

Car builders report that there has been no further action or development in the inquiry of the Hawley roads for approximately 8,000 cars, which has been in the market for several months. Action upon this proposition has been held up because of the uncertainties of the railroads' position arising from the rate controversy and despite recently-revived reports of likely closing soon, it is not expected that this matter will be disposed of until the atmosphere is clearer.

While the increase has not been sufficiently large to give conditions in this line much more activity, it is, nevertheless, encouraging that the railroads are acting a little more freely in the matter of equipment purchases. The cars and locomotives now being bought are largely incidental to general purchasing plans in view and which are dependent for their announcement and consummation upon the settlement of questions now affecting the position of the railroads and including notably the freight rate agitation. Several good-sized orders have recently been placed for all-steel passenger coaches. The Lehigh Valley railroad has ordered 50 all-steel passenger coaches from the Pullman Car Co. and the Standard Steel Car Co. The Pennsylvania railroad has also placed 40 steel suburban coaches with the American Car & Foundry Co. and the Hudson & Manhattan railroad 30 all-steel suburban coaches with the Pressed Steel Car Co. This equipment is for use in the new Pennsylvania tube from Newark, N. J., to the passenger terminal, New York City. The Norfolk & Western has definitely decided to build in its own shops the 500 steel hoppers for which it has been inquiring. The Merchants' Despatch Transportation Co. is figuring on the material for the building of 1 000 refrigerator cars in its shops near Buffalo. The Pan-American Railroad of South America is taking prices on 450 freight, 50 passenger and 10 locomotives.

LIVE MACHINERY NEWS

CHICAGO

Outlook in the Machinery Trade More Hopeful

The approach of inclement weather is causing building contractors, having projects under way, to hasten their operations, and this is having a temporarily beneficial effect on the local machinery market. The railroads are showing a little more liberal attitude in regard to purchases, and are doing more or less quiet buying all the time. The feeling in the market is strong and optimistic.

The Edward A. Pridmore Co., Chicago, recently incorporated, has established a plant at 2300-2318 South Western avenue, for the manufacture of a complete line of molding machines to meet all foundry requirements. The organizers of this concern have all had a wide experience in the manufacture of molding machines. Edward A. Pridmore, who has been elected president, is the eldest son of the late Henry E. Pridmore, and was superintendent of his plant for several years prior to, and for a time after, his death. W. W. Miller, vice president, was associated with the late Heny E. Pridmore after 1899 and worked under Mr. Pridmore's personal supervision for a period of about nine years, in designing molding machines that were placed on the market during that period. Mr. Miller is also well known in the foundry trade throughout the central west, where he was special sales representative for several years. D. C. Snow, secretary and treasurer of the Edward A. Pridmore Co., was associated with the late Henry E. Pridmore for about nine years and had entire charge of the correspondence, sales and advertising departments.

One of the interesting features of the week in machinery circles was the exhibit of foundry machinery and appliances, held by the S. Obermayer Co. at its plant at Eighteenth and Rockwell streets, Chicago, on Wednesday, Oct. 26. The exhibit attracted considerable attention from foundrymen throughout the middle western territory and the attendance was large. The exhibit included a wide range of foundry machinery and formed a graphic illustration of the variety of mechanical appliances used in a modern casting plant. Representatives of the supply trade at the exhibit were practically unanimous in the opinion that business this fall was fully up to expectations, and in many cases exceeded all previous records. The exhibit was so successful that the S. Obermayer Co. has decided to make it an annual affair.

The Mutzinger-Davis Mfg. Co., Pendleton, Ind., will soon commence work on a plant which will include a two-story general factory building, 50 x 150 feet, a two-story office building, 50 x 50 feet, a one-story paint shop and store house, 35 x 150 feet, and a foundry and blacksmith shop, 25 x 150 feet. The plant will be devoted to the manufacture of magnetos and electrical specialties. J. A. Boonstra & Co., Wallace building, Lafayette, Ind., are architects, and the general contract for the building has been let to the Lafayette Engineering Co., Lafayette, Ind.

K. C. Kustberg, Boone, Ia., is drawing plans for waterworks improvements to include 14 40-foot wells, 1,200 feet of 16-inch cast iron suction mains, 18,480 feet of 16-inch cast iron delivery mains, valves, connections, etc.; also a suction pump, 2,000,000 gallons daily capacity, a high duty pump, 3,000,000 gallons daily capacity, and a high duty fire pump, 2,000,000 gallons daily capacity, together with three 150-horsepower tubular boilers, feed water heaters, feed pumps and necessary connections. The estimated cost is $175,000.

Arrangements have been made for the construction of a $350,000 general manufacturing building on Throop street, between Congress and Harrison streets, Chicago. The building will have a frontage of 328 feet, and will be 112 feet in depth; of heavy mill construction, seven stories in height. A portion of the structure will be occupied by the Kaestner & Hecht Elevator Co., now at 440 North Jefferson street. The building will be erected by Frank A. Hecht, a member of the firm of Kaestner & Hecht.

The McCrum-Howell Co. has recently announced through its president, Lloyd G. McCrum, that it would soon commence the erection of a four-story addition to its plant at Racine, Wis. The building will be equipped for the manufacture of electric motors for a stationary vacuum cleaner, and the plant will have a capacity of 10,000 motors yearly.

A. S. Alschuler, architect, 39 Jackson boulevard, Chicago, is preparing plans for a four-story factory building to be erected at the southwest corner of Morgan and Twenty-first streets for I. and S. Lanski. The building will be 127 x 165 feet, of mill construction, equipped with fireproof windows, steam heating plant and electric freight elevators.

D. S. Pentecost, architect, 79 Jackson boulevard, Chicago, is preparing plans for a small, one-story factory, 40 x 50 feet, to be located at Lake street and Fiftieth avenue. The plant will be occupied by the Sam Garvin Electric Co., 1208 Lake street, Chicago.

The Bay City Power Co., Bay City, Mich., expects to make some extensive additions to its system and to purchase additional power generating and transmission machinery. The company has received permission from the State Railroad Commission to issue bonds for $500,000 to cover the cost of the new work.

The Illinois Bolt, Nut & Forging Co. has practically completed its new plant at One Hundred and Forty-third and Clark streets, Hammond, Ind., and will move from its old plant at Thirty-fifth street and Ashland avenue, Chicago, in about a week. The new plant has more than double the capacity of the old shop.

The Rocky Ford Milling & Power Co., Manhattan, Kans., has been reorganized under the name of the Blue River Power Co. The company operates a power plant on the Blue river, four miles from Manhattan. It is intended to increase the output of the power house to 1,000 electrical horsepower.

C. A. Eckstrom, 131 La Salle street, is receiving estimates for a three-story manufacturing building, 20 x 75 feet, to be located at 507 East Thirty-ninth street. The building will be of mill construction with electric freight elevators and a steam heating plant, and it is being built for the F. B. Williams Co.

Elias H. Henderson and associates of Chicago, have incorporated the E. H. Henderson Co., Chicago, with a capital of $50,000, to engage in a general forging, manufacturing and blacksmithing business. It is reported that the company will erect a plant for the production of drop forgings of all descriptions.

The Moline Pump Co., Moline, Ill., has decided to locate its new plant at Ottumwa, Ia. It will erect at a cost of $5,000, a two-story warehouse and office building, 80 x 150 feet, a foundry, 80 x 120 feet, a machine shop, 100 x 200 feet, an engine room, 40 x 60 feet, and a paint shop, 60 x 80 feet.

The Marshall Furnace Co., Marshall, Mich., will erect a foundry, office and storage building on the site of its new plant. The structures will be 154 x 124 feet, 40 x 50 feet, 140 x 160 feet, and 36 x 50 feet. Bids will be received by the De Vere-Gormley Co., Ohio building, Toledo.

Harlin Brown, Interlochen, Mich., is preparing plans for the construction of a hydro-electric power plant, which will supply electricity for light and power for the villages of Mesick, Buckley, Wexford, Glengarry, Harrietta, Interlochen and Traverse City, Mich.

C. J. Hancox, architect, 184 La Salle street, Chicago, has awarded the general contract for a machine shop to be built at 215 Leavitt street, to Cameron brothers, Chicago. Penderlick

Brothers, 215 Leavitt street, Chicago, are owners of the new structure.

The Simmonds Mfg. Co. is tearing down one of the large buildings which constitute its plant, located at Western avenue and Sixteenth street, Chicago, preparatory to moving to the new plant now being constructed at Lockport, N. Y.

The Hubbard Steel Foundry, East Chicago, Ind., is making some extensions to its plant and is erecting a new steel frame building. Contract for the construction of the building has been let to the Worden-Allen Co., Milwaukee.

Magnus Swenson, Madison, Wis., president of the Wisconsin Power Co., states that his company is preparing for the construction of a large hydro-electric power plant near Prairie Du Sac, Wis., on the Wisconsin river.

The machine shops of the Southern Railway, Princeton, Ind., which were destroyed by fire recently, causing a loss of $200,000, will be rebuilt. The company will be in the market for a number of machine tools.

The Clarksville, Tex., Light Co. will rebuild its electric light and power plant, which was recently destroyed by fire. The new plant will be double the capacity of the old one.

The General Mfg. & Machine Co., Appleton, Wis., has been incorporated by B. P. Pollach, George L. Hart and W. H. Scheel for $25,000. The company will engage in the manufacture of steel ranges.

The Railway Materials Co., Chicago, is having plans drawn by Bacon & Hulett, architects, Spitzer building, Toledo, for an addition to its building in the latter city. This addition will be used as a foundry.

The West Allis Iron Works, West Allis, Wis., is erecting a new foundry of brick and steel construction, 85 x 100 feet in size. P. M. Christianson, 938 Howell avenue, Milwaukee, is architect.

The Green Engineering Co., East Chicago, Indiana, with offices in the Steger building, Chicago, is in the market for a new yard electric traveling crane, together with the necessary runway.

The Fostonia Aluminum Mfg. Co., B. E. Rockoff, president, Mishawaka, Ind., has awarded a contract for the erection of a foundry and office building to Bloomer Bros., Mishawaka.

The Michigan Crank Shaft Co., Muskegon, Mich., has decided to postpone the erection of its proposed new factory until next spring.

The Mutual Light, Power & Telephone Co. is planning to erect a power plant at Farmer's Mine, near Palisades, Colo.

The Bay City Power Co., Bay City, Mich., will soon be in the market for new machinery for extensions to its system.

The Veitch-Matthews Engineering Co., Bessemer, Ala., will build a plant for the manufacture of a rotary engine.

The Union Foundry Co., Anniston, Ala., will erect a 250-foot addition to its main foundry building.

Schlesingerville, Wis., is in the market for pumping machinery for its municipal water works.

NEW YORK

Subway Contracts Afford Good Machinery Prospects.—Market Quiet.

With but few exceptions, machinery houses in the metropolitan territory report a quiet condition of business during the week, but a steady improvement in prospects and general sentiment. The convention of the National Machine Tool Builders' association brought to this city machinery men from all over the country and the opportunity was presented to get a consensus of opinion covering a wide business area. The result shows that the interests represented at the convention will have little cause to complain of 1910 profits, and a cheerful view of next year's developments is generally held. The volume of inquiries in the market is very large but a hesitancy to close prevails among consumers. It is believed, however, that the equipment needs which this inquiry represents are not so pressing that they cannot be deferred until after the election. The Pennsylvania Railroad Co., has closed on several machine tool inquiries which were put out early in the month, and manufacturing plants have placed orders for single tools, and small lots of machinery during the week. Hoisting and conveying apparatus is in fair demand, and due to the favorable weather conditions, contractor buyers have been more prominent in the machinery trade than is usual for this time of the year. The prospects for extensive buying of contractors' equipment are very bright at the present time, due to the recent opening of bids for subway building in New York. The vast outlay to be made in this work will call for the buying of much equipment of various types. Twenty-three contracting firms have submitted bids upon some part of the work.

Manning, Maxwell & Moore, 85 Liberty street, New York, booked the large business placed by the Missouri Pacific Railroad Co., reported last week as having been closed. About 300 machines are included in the order, aggregating approximately $300,000 in value. Delivery will be extended well into 1911, due to the special designs of the machines specified and to the fact that a good many of the machines will be motor-driven.

The Mayer Ice Machine Co., builder of ice machines and refrigeration plants, has acquired an old manufacturing property with Hudson river dock frontage near the Pennsylvania terminal, Jersey City, and is remodeling the buildings for its line of manufacture. The company now has a plant on Montgomery street, Jersey City. The purchase of considerable equipment for the new plant will be required.

The International Automobile & Engine Co. has been incorporated with a capital of $10,000,000 at Dover, Del. The charter authorizes the manufacture of airships, motor-cycles and motor-boats. William D. Yarnall of Yeadon, Pa., Elwood H. James, Sharon, Pa., and S. C. Seymour, Camden, N. J., are the incorporators.

The Lozier Motor Co. has purchased a plot of six lots at Thompson avenue and Hulst street in Long Island City as a site for a new automobile plant. The new factory will be 100 x 150 feet and six stories in height. This will be the fourth large plant to be erected in this vicinity for the automobile trade in the past two years, the others being those of Brewster & Co., Packard Co., and Palmer & Singer.

Capital is being interested in the organization of a company for the erection of a plant at Paterson, N. J., for the manufacture of wire spinning machinery. It is expected that considerable machine tool equipment will be required in fitting up the shop if the organization of the company is perfected. John L. Mayer, of 330 East Twenty-sixth street, Paterson, N. J., is interested.

The trustees of Lafayette College, Easton, Pa., have decided upon the construction of a new building for the mechanical engineering department to cost about $200,000. It is expected that the building will be started this fall and that it will be ready at the opening of the collegiate year, next September.

The Davis-Bournonville Co., Jersey City, manufacturer of electric welding machinery, is erecting a large addition to its plant which will more than double its present capacity. A large amount of equipment will be required for these extensions.

PITTSBURG

Builders of Rolling Mill Machinery Are Operating Plants Full Time.

Inquiry for all kinds of machinery and equipment during the month of October was much heavier than in September, and the outlook for the early part of 1911 is decidedly better than at any time in the last several months. Practically all of the new inquiries have been made in connection with projects to be undertaken in 1911, but have not resulted in any large awards being made for shipment this year. Actual bookings during October were only slightly heavier than during the preceding month, and the market continues rather spotty as regards new business for immediate shipment. Builders of heavy rolling mill machinery, cranes, etc., are operating their plants on a fairly satisfactory basis and anticipate the placing of some large awards in the near future. Transportation companies are buying more freely, but practically all this trading is being done in a quiet way.

The National Bolt & Nut Co., Pittsburg, manufacturer of hot pressed nuts, is increasing the capacity of its plant, located at Sixty-second street and the Allegheny Valley railroad, Pittsburg. The improvements include additions to present buildings and the installation of the machinery for the manufacture of cold punched nuts. The equipment will consist of a 150-horsepower gas engine, nut presses, nut tappers, machine tools, etc. The plant now has a capacity of 75,000 cases of hot pressed nuts annually. The improvements now being made will make it one of the largest nut works in Pittsburg.

The Wheeling Mold & Foundry Co.,

Wheeling, W. Va., to whom the subcontract for steel castings, aggregating $1,000,000 in value, for the Panama Canal lock gates was awarded, has shipped the first consignment of castings to the McClintic-Marshall Construction Co., Pittsburg, which has the general contract for the work. The Wheeling concern is erecting a new warehouse and is operating its plant full time.

Electric power will be used in the new plant of the Davis-Price Foundry & Machine Co., New Cumberland, W. Va., for which ground has been broken. The brick work on the new structure will be started this week and the machine shop will occupy the site of the former plant, which was destroyed by fire recently. The foundry department will also be in the same location, but will be extended 30 feet.

The directors of the McKeesport Chamber of Commerce, McKeesport, Pa., are considering propositions from six manufacturing concerns that desire to locate in that city. The names of the firms are withheld. This announcement is made in connection with the campaign started recently to have additional manufacturing plants erected along the Monongahela river.

The Kelley & Jones Co. is increasing the capacity of its plant at Greensburg, Pa., by the erection of a four-story building, 60 x 400 feet. A brass foundry will be located on the top floor. The new structure will be of concrete construction. About 1,300 men will be employed at the plant, when the improvements are completed.

The new business entered on the books of the Westinghouse companies during the month of October compares favorably with that of September. All of the plants of the Westinghouse Electric & Mfg. Co., Westinghouse Air Brake Co. and the Westinghouse Machine Co. are running full time.

The Republic Iron & Steel Co. is awarding some contracts in connection with the new open-hearth steel plant in the Youngstown district. The company has just closed a contract for approximately 365 charging boxes. Additional contracts for other equipment will be awarded shortly.

The Ohio Valley Enamel Co., Pittsburg, has been chartered at Dover, Del., with a capital of $10,000, to manufacture enamel and galvanized wares. The incorporators are Edward H. Hindley, Joseph R. Paull and Alexander J. Barrier, all of Pittsburg.

The Burry Compressor Co., Erie, Pa., is building a 70 x 100-foot extension to the main building of its plant. The company is operating full time and October bookings showed a big increase over the preceding month.

The Westinghouse Electric & Mfg. Co. has awarded a contract to the Golden & Crick Co., Pittsburg, for the erection of a brick and concrete cloth and wire insulating building at East Pittsburg, Pa., to cost $14,000.

The Pittsburg Machinery Equipment Co., Fulton building, Pittsburg, is in the market for 150 to 300 pounds capacity, steam-driven air compressor, and two 36-inch gage, air or steam locomotives.

The Modern Tool Co., Erie, Pa., is installing new machinery, which will require an expenditure of $20,000.

BUFFALO

Machine Tool Trade Continues Quiet With Few Inquiries.

The past week has shown no improvement in the machinery market, in fact the amount of business placed has been somewhat less than the previous week, and there is a slight decrease in inquiries for tools of all kinds. Some power equipment has been under negotiation for some time and will probably be let soon, but new business in this line has not been as good as usual. Industrial concerns are not showing a disposition to go ahead with contemplated extensions, and building plans filed in the week show a decided decrease.

The Augustine Automatic Rotary Engine Co., Buffalo, will, within a few weeks, be in the market for equipment to be installed in the plant which this concern will shortly build. Plans for some of the buildings are completed and contracts will soon be let. The equipment required will include horizontal and universal lathes, drills, drill presses, grinders, shapers, shafting, belting and pulleys. Specifications for the equipment have not been prepared. John Franey, 738 Ellicott Square, is secretary of the company.

WASHINGTON

Government Awards and Other News.

On Nov. 8 the paymaster general, navy department, Washington, will open bids for furnishing the following supplies: Schedule 3006, class 61, Boston, four vertical, simplex piston steam pumps; schedule 3014, class 71, Brooklyn, 300 tons steel castings; schedule 3015, class 81, Portsmouth, six complete sets propelling machinery for motor dories; schedule 2987, Puget Sound, class 21, 9,000 pounds medium steel, class 22, 21,000 pounds medium bar steel, class 23, 3,500 pounds bar steel; schedule 2988, class 25, Mare Island, twist drills. On Nov. 15, he will open bids for the following: Under schedule 2992, class 1, Mare Island, two flat turret lathes; schedule 3011, class 2, Mare Island, 50 pneumatic hammers; schedule 3012, class 11, Puget Sound, 60 tons cast iron scrap.

During the past week the paymaster general, navy department, Washington, made awards as follows: Under schedule 2810, Washington, 9,000 pounds rough steel forgings and 170 forgings to the Midvale Steel Co., Philadelphia, at $4,328.26; schedule 2828, Washington, 453,600 pounds steel castings, to the Federal Steel Foundry Co., Chester, Pa., at 4¼ cents; schedule 2847, Brooklyn, cold rolled steel, to the Crucible Steel Co., Pittsburg, at $962.25; schedule 2933, Norfolk, one sensitive drill press, to P. J. Kemp, Baltimore, at $174.75.

R. C. Hollyday, chief of the bureau of yards and docks, navy department, Washington, will receive proposals indorsed "Proposals for Machinery for Power Plant," until Dec. 3, for two 300-horsepower boilers, piping, economizer, flue, boiler feed-pumps, motor-generator set, wiring, etc., for the U. S. naval station, New Orleans.

The general purchasing officer, Isthmian canal commission, Washington, has awarded the two pile-driving steam hammers, under circular bulletin calling for bids to be opened Oct. 14, to the Vulcan Iron Works, Chicago, at $2,054.

E. M. Adams, captain of engineers, Charlestown, S. C., will receive proposals until Nov. 24 for furnishing steel forgings, castings, etc., for Granby Dam, Congaree river, S. C.

Beekman Winthrop, acting secretary Navy department, Washington, will receive bids until Nov. 12 for completing the power plant at the United States Naval Academy, Annapolis, Md.

Inquiries regarding the following opportunities for trade should be directed to the bureau of manufactures, department of commerce and labor, Washington. In each case the file number should be given:

No. 5678.—An American consul in the United Kingdom reports that an engineer is desirous of being placed in communication with American manufacturers of machine tools, hardware, mechanical goods, and labor-saving devices of all kinds, who desire a European agent.

No. 5650.—An American consul in a Latin-American country has forwarded pamphlets containing the specifications for a large tonnage of cast iron pipe, sluice and other valves for water supplies.

No. 5679.—An American consul in Mexico reports that a company has taken the preliminary steps for the erection of a smelter in his district. The smelter will have a capacity of 100 tons daily, and will be constructed on modern lines.

CLEVELAND

Second-Hand Machinery Active—General Conditions Show Little Change.

The past week developed little of interest to Cleveland machinery dealers. Inquiries and actual sales of new machinery were of about the same volume as the preceding week. In second-hand machinery, however, conditions appeared to be somewhat more active. Dealers reported a fair demand, and purchases of several small lots were made at attractive figures. General supplies for foundries and machine shops were also in fair demand. Manufacturers of agricultural machinery and implements, in this vicinity, report that they are booking some very attractive orders, as farmers are buying in larger volume than usual. Makers of heavy machinery such as cranes, etc., again report little new business and most manufacturers of such equipment do not look for much improvement for some months. During the past two weeks building permits were awarded for the erection of a number of machine shops and manufacturing establishments. Most of these were on a small scale and not much new machinery will be called for immediately by the builders.

The Johnston & Jennings Co., Cleveland, is shipping this week the entire

machinery for the finishing end of the new, No. 2 structural mill, for the Illinois Steel Co., South Chicago, Ill. This consists of a straightening table and six finishing-end tables. The latter are arranged for shearing and inspection, and each of the six are furnished with skids for loading. Four of the tables are also equipped with pull-up machinery for transferring from one table to another or to the loading skids. The Johnston & Jennings Co. is also making a large shipment of shearing and loading tables for the 30-inch universal mill at South Chicago. This concern also reports good sales and inquiries for its belt-driven power-hammers.

The International Harvester Co. reports that the new, fire-proof building at its Champion works, Springfield, O., will be used for its forge shop and a gray iron foundry. The former will be equipped with general forging machinery, while the latter will be equipped with small traveling cranes, over the floors, and an overhead trolley for distributing the iron and carrying out the castings. The equipment in the old foundry will be installed in the new shop when the latter is completed.

George S. Rider & Co., Century building, Cleveland, are preparing plans for a 200 x 80-foot, one-story and a 170 x 60-foot two-story building for the Cleveland Foundry Co. Work on these buildings will begin immediately. They will be equipped with stamping and enameling tools and furnaces, most of which have already been contracted for.

The Sabin Machine Co., 5714 Euclid avenue, Cleveland, is erecting a two-story, 136 x 46-foot machine shop on Carnegie avenue. The new plant, which will be ready for occupancy about Dec. 1, will be equipped with a number of small electric motors for operating the various departments. Most of the machinery has been contracted for.

TORONTO

Cheap Power Interests Many Manufacturers.

Activity in the leading lines of machinery continues, most of the plants having plenty of orders. The construction of the provincial hydro-electric transmission system for supplying the municipalities of western Ontario with cheap electric power from Niagara Falls, which is already in operation at some points, has considerably stimulated manufacturing enterprises, and many new industries are being started. The demand for electrical equipment is particularly good.

The Phillips Co., Detroit, will establish a factory at Guelph, Ont., for the manufacture of commercial motor vehicles, the city having granted this concern a factory building at a nominal rental for three years, and for $600 a year for four years thereafter. The company will employ 50 hands.

The Maximilian Pneumatic Tool Co., Buffalo, has agreed to establish a Canadian branch concern at Woodstock, Ont., with a capital of $100.000, for the manufacture of pneumatic hammers and drills, having received concessions from the city.

The Garlock Packing Co. has purchased the factory on Queen street, North, Hamilton, formerly occupied by the Ontario Tack Co., for about $25,000. It will be enlarged and remodeled for the requirements of the packing company.

The Stewart Sheaf Loading Co. will shortly erect a factory at Elmwood, Man., for the manufacture of sheaf loaders, to be in operation in time to supply next season's demand.

Medicine Hat, Alberta, has ratified a bylaw granting a free site and a natural gas well valued at $10,000 to the Alberta Iron Rolling Mills Co.

MILWAUKEE

Association of Wisconsin Manufacturers to be Organized.

President Otto H. Falk of the Milwaukee Merchants' and Manufacturers' association, has appointed the following committee to consider plans for the organization of an association to include all manufacturers of Wisconsin: G. F. Steele, Nekoosa-Edwards Paper Co., Port Edwards; A. L. Osborn, Scott & Howe Lumber Co., Oshkosh; C. W. Dickerson, La Crosse Rubber Works, La Crosse; C. G. Simmons, Simmons Mfg. Co., Kenosha; Fred Robinson, J. I. Case Threshing Machine Co., Racine; Thomas M. Blackstock, Sheboygan; August S. Lindemann, Wisconsin Brewers' association, Milwaukee; D. P. Lamoureaux, Beaver Dam Malleable Iron Co., Beaver Dam; Harry E. Bolens, Gilson Mfg. Co., Port Washington; J. A. Vail, Fairbanks-Morse Co., Beloit; L. E. Geer, Manitowoc Boiler Works Co., Manitowoc; L. C. Tolles, Phoenix Mfg. Co., Eau Claire; C. A. Johnson, the Gisholt Co., Madison; Frank Sensenbrenner, paper manufacturer, Neenah, and Otto H. Falk, Falk Co., Milwaukee. This committee will soon hold a meeting in Milwaukee for the purpose of considering the industrial insurance question and for considering preliminary plans for the organization of the association.

A. D. Meiselbach, of the Meiselbach Mfg. Co., manufacturer of commercial automobiles, is preparing to establish a new bicycle factory at North Milwaukee. Mr. Meiselbach was formerly engaged in this business but sold his plant with the understanding that he was not to engage in the manufacture of bicycles for a period of ten years. As this time has now elapsed he is planning to establish a plant that will employ at least 250 men.

L. J. Monahan, vice-president of the Termaat & Monahan Co., Oshkosh, Wis., manufacturer of pumps and engines, states that there is an increasing demand for stationary pumps. The Doman Co., manufacturer of gasoline engines, Oshkosh, also reports business to be good. The shipments to British Columbia have been especially heavy this season, according to the secretary of the company.

Campbellsport, Wis., is to have a new and enlarged electric light plant. The works have been acquired by Milwaukee capitalists, who are planning to rebuild. The new structure will be of brick and concrete and will be equipped with a gas producer and two generators.

The Gadsden Car Works, Gadsden, Ala., will build several additions to its plant, including a wood shop, repair shop and machine shop. The equipment required will include three rivetters and punching presses. W. H. Porter is superintendent.

Milwaukee machinery manufacturers are displaying considerable interest in the proposed plan of the Milwaukee Merchants' and Manufacturers' association for holding a "Made-in-Milwaukee" show in the auditorium in March.

The Allis-Chalmers Co., Milwaukee, has completed the installation of a new electric power plant at Kenosha, Wis., for the Thomas B. Jeffery Co., manufacturer of automobiles. The new plant has a capacity of 2,500 horsepower.

The new plant of the Milwaukee Machine Tool Co., West Allis, Wis., has been completed. Clarence Didon will be general manager of the works and George Douglas will be superintendent.

CINCINNATI

Machine Tool Builders Receive Large Orders From the Railroads.

For the first time in several months, machine tool builders have been given an opportunity of figuring and bidding on several lists of tools for two large railroad interests. Quite a number of standard tools were embraced in these schedules, and Cincinnati and Hamilton builders secured a fair proportion of the orders. As a rule, machine tool builders are receiving about enough new business to meet daily requirements and to maintain the same basis on which they have been running for the past six months. Along certain specialized lines, however, demand appears to be less active, and in some instances it has been necessary to largely decrease the working forces to meet changed conditions. Dealers in second-hand machinery are reasonably well satisfied with trade conditions, and state, that while they have booked no orders for any particularly large consignments, the aggregate is large. The work of the Industrial Bureau is being expanded, and great efforts are being made to secure a number of plants that are known to be seeking new and more desirable locations. One of these, which outside capital is proposing to establish, is a file factory, and the bureau is endeavoring to secure a building suitable for its needs.

According to Gilberto Orozco, a well-known hydraulic engineer of South America, there are great possibilities within reach of machine tool and other manufacturers, in the enterprises and developments that are now under way in Ecuador. Mr. Orozco has been a visitor in this city during the week in the interest of several large enterprises which he represents and has been a welcome guest at a number of the manufacturing plants. The aggregate value of the output of Cincinnati machinery and machine tool plants, as

compiled by Superintendent Murray of the Chamber of Commerce, in his annual report, was $15,000,000.

The Cincinnati Traction Co. has commenced the erection of an addition to its boiler house that will be 40 x 60 feet. This structure will be of concrete and steel construction, and will be utilized for housing two additional boilers of 525 horsepower capacity each. When completed, the plant will have 14 boilers, representing a capacity of 7,250 horsepower. The estimated cost is about $50,000.

The work of placing the foundations for the machinery in the new plant of the Victor Safe & Lock Co. is now under way. Cosiderable new equipment will be added, a portion of which has aleady been secured. The buildings are models of their kind, and the plant when completed will be one of the largest safe manufacturing concerns in the world.

The Newport Rolling Mill Co., Newport, Ky., will install an electric generating unit, including a 300-kilowatt, 200-volt direct current generator, direct-connected and a non-condensing engine, complete with switchboard and instruments.

The Norton Machine Co., Cincinnati, wants prices on a Stirling water tube boiler, and a 100 to 150-horsepower tandem compound Corliss engine.

SEATTLE

Hydro-Electric Development Extensive—Machine Tool Trade Quiet.

All projects that can be postponed or delayed without future inconvenience are being held up awaiting the result of the elections and the railroads are finishing such improvements as they have begun. Many large hydro-electric developments and irrigation projects are being carried through and many contracts of considerable size are being let in the east for this class of work.

The Independent Electric Co., Portland, Ore., has purchased the Haines Light & Power Co. and the Hillsboro Water, Light & Power Co. The Independent company has plans to supply a number of towns above Hillsboro, and transmission lines will run to Cornelius, Dilley, Orenco and Beaverton. The company will be in the market shortly for considerable new machinery.

The Smith Cannery Machines Co., Seattle, Wash., just completed an 18-inch engine lathe after designs and patents of its own. This concern is in the market for a number of machine tools, including milling machines, and turret lathes. A full line of lathes will be placed on the market in the near future.

The Washington Iron & Steel Co., Spokane, Wash., is completing plans for the erection of a $50,000 reduction plant at Leavenworth to develop a deposit of iron ore covering some 300 acres near Blewett.

J. C. Barton, civil engineer, Seattle, desires prices on service taps, hydrants, valves, meters, etc., in connection with the water system for Twisp, Wash., on which he is engaged.

MISCELLANEOUS

The board of education, Akron, O., will receive bids until Nov. 22 for furnishing and installing mechanical feed stokers to be applied to two 150-horsepower tubular boilers, 72 inches x 18 feet, set in battery, for the new South High School building. T. F. Bernhart is clerk.

Bids will soon be asked by the Metropolitan Water & Sewer Board, Boston, Henry H. Sprague, chairman, for the installation of a 2,500-horsepower hydro-electric plant in the power house at the Wachuset dam; $115,000 has been appropriated for the work.

The Hobbs-Newby Equipment Co., Seaboard Bank building, Norfolk, Va., wants prices on a second-hand, 6 x 15-foot, 125 pounds pressure, return tubular boiler, and a second-hand 30 to 50-horsepower marine kerosene oil engine.

The board of control, Norfolk, Va., will receive bids until November 19 for designing, furnishing and installing three electrically-driven centrifugal pumps as follows: One 2,000-gallon, one 3,000,-gallon and one 4,000-gallon.

The Borough council, South River, N. J., will receive bids until Nov. 28 for an electric light, power and pumping plant. W. W. Young, 220 Broadway, New York City, is consulting engineer.

The Frontier Iron Works, 149 Jewell street, Brooklyn, manufacturer of babbitt metal, are considering the enlargement of their present facilities, which will require a fair sized purchase of machine equipment.

The E. R. Allen Foundry Co., Corning, N. Y., is contemplating the purchase of a number of machine tools and other equipment which will materially increase its present capacity.

The Croisse Realty Co., New York, has closed for a 400-horsepower Ames gas engine for installation in the power and light plant of its new office building in the up-town district.

Cyrus Currier & Son, Newark, N. J., general machinists, have completed additions to their plant and have made some enlargement of their mechanical equipment.

The Fay Machinery Co., 126 Liberty street, New York City, wants prices on a 118 to 130-kilowatt, second-hand belted generator, 2,300 to 2,400 volts, two-phase, 60-cycle, with exciter.

Preliminary plans for a hydro-electric plant at Clark's Rips, Lewiston, Me., are being prepared by the Union Electric Co., Lewiston; 20,000 horsepower is to be developed.

The Geer Hydro-electric Co., Troy, N. Y., will erect a power plant to generate 300 horsepower. A steel flume 42 inches in diameter, to connect two ponds, will be required.

The J. E. Moss Iron Works, Wheeling, W. Va., will erect a building to be equipped for the manufacture of structural steel, fire escapes, fences, stairs, elevators, etc.

The Fifth Avenue Railway & Light Co., Columbus, O., is planning to erect a power plant on West Fifth street.

J. A. Epps, Real Estate Trust building, Philadelphia, wants two 8¼ x 10-inch direct-connected, double drum hoisting engines, with boilers, for Ohio delivery.

The Stone Electric Light & Power Co., Wythville, Va., is planning improvements to its electric plant. William Walter is engineer at the power station.

C. Howard Lloyd, Telegraph building, Harrisburg, Pa., is preparing plans for a new pumping station, bids for which will be asked in about a month.

The city council, Coshocton, O., is considering the purchase of a new hydraulic pump, and making other improvements to its waterworks system.

The Bay View Foundry & Machine Co., Sandusky, O., has purchased additional property adjoining its plant and will build an addition.

The Seaboard Pipe Foundry Co., Savannah, Ga., has plans for several additions, including a machine shop, tapping room, etc.

The Metal Products Corporation, Providence, R. I., has purchased a site for a plant in that city.

F. E. Wills & Son Co. is building a machine shop and a forge shop at Greenfield, Mass.

ENGINE SHIPMENTS.

Recent shipments made by the Wisconsin Engine Co., Corliss, Wis., include the following:

J. M. Kohler Sons Co., Sheboygan, Wis., one 24 x 46 x 42 horizontal cross compound direct-connected Corliss engine.

Illinois Steel Co., Milwaukee, one 32-56 x 48 tandem compound heavy-duty rolling mill engine.

Girard Iron Co., Girard, O., one 28 x 60 simple heavy-duty rolling mill engine; one 30 x 60 simple heavy-duty Corliss engine.

Jones, Coates & Bailey, Chicago, Ill., one 20 x 42 simple heavy-duty Corliss engine.

ON CRATING STOVES.

The Southern railway has asked the approval of the South Carolina railroad commission of an order prohibiting loose or uncrated shipments of stoves and ranges. The commission has asked all persons interested to appear before the commission, Nov. 22, when a hearing will be had.

The Youngstown Iron & Steel Roofing Co., Youngstown, O., will have its new 60-inch and 72-inch mills ready for operating the latter part of November. When the two mills now under construction are completed, the company plans to provide two additional mills.

Stockholders of the Clark-Power Wagon Co., Lansing, Mich., have authorized a bond issue of $50,000, with which to start operating.

VARIOUS PLANTS

Acquired by McCrum-Howell Co.—Capital is Increased.

Dispatches from different cities state that the McCrum-Howell Co., manufacturer of boilers, radiators and vacuum cleaners, has acquired control of a number of manufacturing plants and companies engaged in its line of business and that it now owns 80 per cent of the stationary vacuum cleaning industry of the country as well as the basic patents. The companies reported to have been absorbed are the Model Heating Co., of Philadelphia and New York, one of the largest boiler and radiator manufacturers in the east; the Cameron, Schroth, Cameron Co., Chicago, large wholesalers of boilers and radiators; the American Air Cleaning Co., Milwaukee; the Vacuum Cleaner Co., New York; and the Sanitary Devices Co., San Francisco, while several other companies are now being negotiated with. At a special meeting of the board of directors of the McCrum-Howell Co., held in New York, the past week, an increase in the company's capital stock of $2,000,000 preferred and $2,000,000 common was authorized to cover the acquisition of the several properties. The total capital stock of the company is now $7,000,000, equally divided between common and preferred. The McCrum-Howell Co. has plants in various cities for the manufacture of boilers, radiators and vacuum cleaners.

SHOT WHILE ESCORTING HIS WORKMEN.

Harry B. Humphrey, president of Humphrey & Sons, manufacturers of wire mill machinery and a prominent citizen of Joliet, Ill., was shot down from ambush just outside the limits of that city shortly after 6 p. m., Oct. 25. A number of shots were fired, but only one took effect. It lodged in Mr. Humphrey's leg just below the hip, inflicting a painful and serious wound, although not fatal. Mr. Humphrey was escorting a number of independent workmen when the attack occurred.

TALK OF PLANS FOR TWO NEW STACKS.

It is expected that definite announcement will be made in the near future by the Pittsburg Steel Co. regarding plans for two blast furnaces of 500 tons capacity each, additional open-hearth steel furnaces and other improvements at its Monessen, Pa., works. The report that the company has prepared plans for blast furnaces is an old one, but it is now stated that the company will issue $3,000,000 bonds, following a meeting of the stockholders to be held in the near future, and that executive officials have decided to go ahead with the new work. At present, the company is getting its raw material on long time contracts, which will expire next year.

INITIAL SHIPMENT OF ORE TO THE SOO.

On Oct. 19 the first large shipment of iron from the Magpie iron mine in the Michipicoten district, acquired by the Lake Superior Corporation about a year ago, was made to Sault Ste. Marie, consisting of 700 tons. The Corporation has built a railroad from its Michipicoten branch, six and a half miles, to the Magpie river, to connect with the mine, which, it is expected, will equal the Helen mine as a producer. When the Magpie mine is in full operation it is expected that the Sault Ste. Marie steel plant will be able to obtain a full supply of ore from these two mines, instead of having, as at present, to import largely from Michigan.

NOVEMBER MEETING OF MECHANICAL ENGINEERS.

A paper on the "Rotary Kiln," by Ellis Soper, of Detroit, will be presented at the New York meeting of the American Society of Mechanical Engineers, Nov. 9. Following this paper, Charles Whiting Baker, editor of Engineering News, will give an illustrated lecture on the Panama canal. Mr. Baker accompanied President Taft and the board of advisory engineers appointed by the president on a trip to the canal zone and is thoroughly familiar with the present status of the canal work. The lecture will be illustrated by lantern slides made from photographs secured by Mr. Baker during the trip.

TAKES OVER CAR WORKS.

The shareholders of the Silliker Car Co. have accepted an offer to purchase the company with its assets and franchises by the Nova Scotia Car Works, Ltd., by the exchange of preferred stock of the Nova Scotia company for shares of the Silliker company.

The Standard Scale & Foundry Co., Kansas City, has been proceeded against in the federal bankruptcy court, and a schedule of the debts of the company has been filed, but not as yet of the assets.

MANY CONTRACTORS

Submit Bids Upon New York Public Subway Construction.

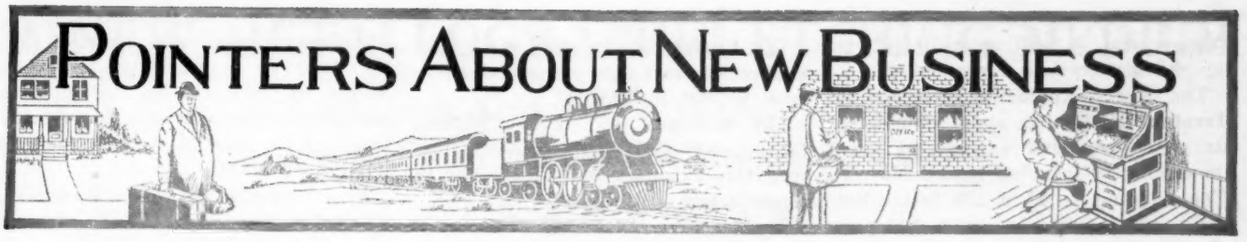
Twenty-three different contracting firms submitted bids which were opened by the public service commission of New York, Oct. 27, for the construction by public funds of the proposed additions to the subway system of the metropolis. The bids submitted cover the construction of 19 sections of the proposed extensions. This represents that portion of the work which is assured by the public funds now available and for which the board of estimate of the city has set aside $60,000,000. The complete system outlined by the proposed extensions covers 28 sections in all, which by reason of insufficient public funds, cannot be built at this time without private capital. As reported, objections to some of the clauses in the form of contract drafted prevented private capital from entering a single bid at the opening scheduled for this form of proposal last week.

It is estimated that the cost of construction of the three routes for which bids were opened will be about $82,000,000, and that it will take about four years to complete. Owing to the voluminous bids and the fact that many contractors bid upon single sections, a submitted figure upon the entire construction has not yet been computed. The only bid for all sections was presented by the Bradley Construction Co., and this is roughly estimated to be about $93,000,000.

The contracts bid upon are for the construction alone and do not include the tracks, these being considered as part of the equipment. The contracts for equipment and operation will not be let for some time. The public service commission, through Chairman Wilcox, has expressed its gratification at the number of bids received, and it is believed that the bids as a whole are well within the engineer's estimates.

Placed in Operation.—The new plant of the Metals Welding Co., 4400 Perkins avenue, Cleveland, has been placed in operation. This concern manufactures oxy-acetylene welding plants, and is also engaged in the welding and brazing of all such metals, such as cast iron, steel, copper, aluminum and brass. Howard H. Snyder, formerly part owner and chief welder of the Braze-Weld Co., Cleveland, is superintendent of this plant.

POINTERS ABOUT NEW BUSINESS



(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

The Machine Parts Co., Elyria, O.; by W. H Ingersoll, O. G. Dunn, J. S. George, W. T. Parsch, J. W. Parsch; $125,000 capital stock.

The Suspension Roller Bearing Co., Sandusky, O.; by E. A. Boyer, W. W. Neighbour, E. W. Neighbour; $250,000 capital stock.

The Metal Extraction & Refining Co, Milwaukee, Wis.; $50,000; by W. J. Scanlon, W. A. Grieb and D. L. Grieb.

The New England Engine & Supply Co., Boston, Mass.; $50,000; by James N. Schoonmaker, Maurice W. Carsley and Walter E. Brownell.

Windsor Superior Mfg. Co., Ltd., Windsor, Ont.; capital, $100,000; to manufacture wares of metal and wood; provisional directors, Walter Bong, John A. Smith, Sherman T. Allen and others.

The National Carburetor Co., Ltd., Ottawa; capital, $25,000; to manufacture carburetors, automobiles, etc.; provisional directors, Albert E. Honeywell, Wm. N Graham and John Rankin.

New Construction:—

The Atlas Brass Foundry, Columbus, O., has let the contract for a brick addition, estimated to cost $800.

Charles A. McDade, Wilkesbarre, Pa., has been granted a permit to build a two-story frame foundry, 42 x 42 feet, at 27 Murray street.

The Appleton Iron & Metal Co., Appleton, Wis., of which A. L. Jacobson is proprietor, is erecting a new building on Winnebago street.

The Frontier Iron Works, 149 Jewell street, Brooklyn, is contemplating extensions that will materially increase its output of bearing metals.

The Ellicott Machine Co., Baltimore, has awarded the contract for a one-story brick addition to its machine shop at the corner of Severn and Bush streets, estimated to cost $4,000.

The Godfrey Pattern Co., Lansing, Mich., has completed an addition, 18 x 32 feet, and has installed considerable additional machinery in its shops.

The Cambria Steel Co. is arranging to receive the machinery equipment at its new wire mill now in course of construction at Morrellville, Pa.

Crane Co., Chicago, is pushing along work on its new building in Sioux City, Ia. The building will be five stories, of vitrified brick, with reinforced concrete floors.

The Suspension Roller Bearing Co., Sandusky, O., has completed a temporary building, and is now installing machinery equipment. The company was recently incorporated with a capital stock of $250,000.

The Union Foundry Co., Anniston, Ala., has announced that it will extend its main building 120 feet for the purpose of enlarging its capacity, which has been steadily growing in the three years that it has been operating.

Samuel L. Moore & Sons Corporation, Elizabeth, N. J., is now installing equipment in its new machine shop, including two cranes, an elevator and various machine tools; in the foundry a cupola and charging floor are being installed.

The Fox-Harris Machine & Supply Co., Pine Bluff, Ark., note of whose new construction was recently made, advises that it is building a one-story house, 120 x 154 feet, which it expects to have completed by Jan. 1 and ready for occupancy.

The new shops of the Racine Iron & Tool Co., Racine, Wis., which are being built on Junction avenue, will be two stories, 60 x 100 feet, and on the lower floor the offices will be located. It is expected that the shops will be operating within a month.

The Superior Stove Works, Chicago, will rebuild its present plant, making it a four-story structure, 75 x 100 feet. The foundry will be located on the top floor. All of the departments will be equipped with the most modern labor-saving appliances. The cost of the building will be about $45,000.

Dietrich Bros., Baltimore, Md., are preparing for the erection of a machine shop and warehouse at 346 North street. A number of buildings on property adjoining the present Dietrich shops are being torn down, and it is planned to erect on the site one of the largest and best equipped machine shops in Baltimore.

Increasing business has led to the Seaboard Pipe Foundry Co., Savannah, Ga., looking about for a site for a larger plant. Plans have been drawn, providing for a main shop, 104 x 185 feet; machine shop and tapping room, 56 x 100 feet; store room, 50 x 100 feet, and a cleaning room, 35 x 100 feet, to be built of steel and concrete or brick.

The Pittsburg Machine Tool Co., North Side, Pittsburg, manufacturer of lathes, planers, etc., has purchased a plot of ground east of Copeland Station, Braddock, along the Pennsylvania railroad, and will erect a new plant, plans for which are now being prepared. The site was formerly occupied by the Dawes Mfg. Co., the plant having been destroyed by fire two years ago. The property is 100 x 300 feet. It is expected that contracts for the new plant will be awarded within the next month.

The National Fire Proofing Co., Pittsburg, which has the general contract for the new buildings of the General Electric Co., at Erie, Pa., has awarded a sub-contract to the H. L. Kreusler Co., Pittsburg, for all the brick and carpenter work on the plant. The first section of the plant will consist of two buildings, one 368 x 400 feet, and the other 275 x 400 feet. The steel work for the foundry building has been awarded to the American Bridge Co., and the work for the machine shop to the Jones & Laughlin Steel Co.

The death of Peter Gendron, vice president of the Gendron Wheel Co., Toledo, came just as the company was on the verge of making extensive improvements. The last few years the business of the company has been conducted under such conjested conditions that a further extension became imperative. With the beginning of the new year, the company had expected to begin the erection of a new building to contain five stories and a basement and to cost $25,000. While the death of

Mr. Gendron will not stop further improvement, it will most likely delay the matter until early spring.

The Ayres Engine & Motor Co, Trenton, Mich., has about completed its new plant and expects to have its machinery installed before Nov. 1. The building is 50 x 170 feet. But little new equipment will be purchased as the company is adding all of the machinery used in the plants of the Ayres Engine Co., of Rochester, and of the Gilmore Motor Co., of Detroit, both of which concerns have been taken over by the Ayres Engine & Motor Co. It will build a line of two and four-cycle marine motors, 1½ to 30 horsepower, and of portable farm and stationary gasoline engine from 1½ to 100 horsepower.

The Trojan Structural Steel Co., Chicago, has just been incorporated with a capital stock of $8,000, and surplus of $2,000. The plant will be located at Forty-Sixth and Grand avenue, on a switch of the C., M. & St. P., and it is expected that it will be in operation by Jan. 1, prepared to do all kinds of truss, bridge and structural work. Charles H. Henderson, formerly shop superintendent for Jos. T. Ryerson & Son, is president and general manager; George H. Bryant, salesman with the Scully Steel & Iron Co., is vice president and treasurer; and John J. Robl, formerly foreman and templet maker for the Lassig Bridge & Iron Works, will be superintendent

Waterloo Cement Machinery Corporation, Waterloo, Ia., has increased its capital stock from $50,000 to $150,000, half of which increase will be paid in immediately in cash, thus making the paid-up capital in cash $100,000. Its sales thus far in 1910 have been practically three times as large as for the corresponding months last year, and the company has found it necessary to improve its facilities for manufacturing. An addition is now being built, 45 x 109 feet, with 23-foot posts. It will be constructed entirely of steel and concrete with concrete floors and will be served with two five-ton electric traveling cranes. Construction is now well along. The manufacture of the Polygon concrete mixer and auxiliary equipment for concrete engineers and contractors will be continued. The officers of the company are: President and treasurer, H. B. Lichty; vice president and superintendent, J. M. Bruns; secretary, L. H. Weideman. The management will be assumed by F. H. Clarke, who, for 20 years, has been connected with Fairbanks-Morse & Co.

General Industrial.—

The Luther Grinder Mfg. Co., Milwaukee, has increased its capital stock from $50,000 to $100,000.

The Michigan Bolt & Nut Works, Detroit, has filed articles renewing its corporate existance without change in capitalization, $300,000.

The plant of the Bandon Foundry & Machine Co., Bandon, Ore., has been sold to H. A. Edlin, of Marshfield, for a consideration of about $10,000.

J. W. Pohlman Foundry Co., Buffalo, which recently increased its capital stock, advises that the increased capital is to care for improvements already made and completed.

The Ellery Twist Drill Co.'s stockholders recently voted to increase the capital stock from $25,000 to $50,000 by an issue of $25,000 of first preferred 6 per cent cumulative stock.

The Tofte Boiler & Sheet Iron Works, Inc., Houston, Tex., advises that while it has purchased property adjoining its present plant, it does not contemplate at present improving it.

Raymond Mfg. Co., Ltd., Corry, Pa., advises that the recent fire in its plant did not do as serious damage as first reported. It was confined to a new storage building just being erected. Its plant was not injured and was in full operation the next day.

The Duncannon Iron & Steel Co., Duncannon, Pa., was recently chartered with a capital stock of $300,000 by Samuel L. Light, J. Warren Light and William S. Davies, treasurer, the incorporators being residents of Lebanon, Pa. The Duncannon plant was recently bought by Samuel L. Light.

The Commercial Iron Works Co., Pen Yan, N. Y., whose plant was destroyed by fire some time ago, will be succeeded by a new concern through the efforts of a local business man's association. The new company will be capitalized at $30,000, and the board of directors will include William N. Patteson, William N. Wise, William T. Morris, Ernest R. Bordwell, Frederick H. Lynn, S. A. Allen and John Whitaker.

The Moline Pump Company Foundry Association, which has been considering offers to locate its plant elsewhere, has announced its decision to remain in Moline, Ill. The members of the association, R. L. Schofer, J. G. Miller and Fred Wegge, will incorporate shortly, and will build a model foundry in Moline. The association was formed three years ago to take over the Moline Pump Co.'s plant, and has since been successfully operating it.

The Oklahoma Iron Works, Tulsa, Okla., advising respecting a recently noted fire at its foundry, says that the damage was comparatively small. The foundry was badly scorched, but the company is repairing it without having to dismantle the building. No machinery equipment was lost in the fire, and the loss to its patterns will not exceed $2,000.

The Norwalk Drilling Tool Co., Norwalk, O., which was recently organized with Charles W. Stoup as secretary and James Kavanaugh, general manager, has secured a very complete equipment for the manufacture of drilling and fishing tools for oil, gas and artesian well drilling. This company has no connection whatever with any concern or individual previously engaged in this business in Norwalk.

Application has been made for a state charter by an organization to be known as the Western Steel & Iron Co., Pittsburg, Kas., and as soon as it is approved a contract will be entered into with citizens of Pittsburg to build a rolling mill in that city. A mill at Louisville, Ky., that has been idle for some time, will be removed to Pittsburg. Work of putting in foundations was commenced Nov. 1. Walter Baird is one of the promoters of the company. W. L. Packard, president of the Commercial club of Pittsburg, will act as trustee for the investing citizens of Pittsburg.

Trade Note:—

Charles K. Mohler has opened an office as consulting engineer at 1839 McCormick building, Chicago. Mr. Mohler is engineer for the Loop Protective and Improvement Association, and will specialize on the construction, design and superintendence of steam plants and electric railways.

Fires:—

The machine and blacksmith shop of Williams Bros, Cly, Pa., was damaged Oct. 14, the loss being estimated at $2,000.

The brass foundry of Martin Reynolds & Son, 68-70 Richardson street, Brooklyn, caught fire on Oct. 14, causing a loss estimated at $20,000

Fire starting from the cupola damaged the Enterprise Iron Works, Fort Worth, Tex., Harrell Bros., proprietors, on Oct. 18. The fire did not reach the pattern room. The loss is estimated at $1,500, covered by insurance.

The plant of the W. H. Howell Co., Geneva, Ill., was badly damaged, Oct. 23. The shops, tool room, plating department, etc., containing quantities of stock and machinery, were destroyed, the loss being estimated at $20,000, with insurance of $15,000.

A NEW METALLOGRAPHIC ETCHING MEDIUM

Sulphurous Acid Added to the List of Re-agents Employed in Metallurgical Research

By S. Hilpert[2] and E. Colver-Glauert.[3]

At the present time metallography is encumbered with such a large number of diverse etching media that it is only with considerable diffidence that a proposal can be put forward to lengthen the list. Probably by far the greater number of these re-agents have been proposed for the express purpose of developing the structures of hardened and tempered steels, or to resolve some special constituent of such steels, so that a special re-agent is recommended for nearly every constituent and structure. In order to obtain new effects, a number of highly complicated organic and inorganic compounds have been proposed and to some considerable extent used. The action of many of these compounds is only very little understood and in many cases they fail to produce a clear structure, which is a *sine qua non* where photo-micrography is concerned.

The metallography of iron and steel being a science of such extremely wide practical application, this state of affairs is highly regrettable, as such a complication acts as a great deterrent to its employment by men connected with practical iron and steel metallurgy, and what should be a most practical science is ultimately regarded as being of solely academical interest.

Even when the comparative actions of the re-agents referred to are known, there still remains the difficulty of their preparation in ordinary works practice, where a certain structure only occurs occasionally, and where various obscure alcohols, benzol derivatives, etc., do not find a place in the laboratory. Many of these re-agents are also impracticable in so far as they occupy any time from half an hour to a whole day for etching to be complete. There has certainly been some reason for employing new reagents for hardened steels, since the simple dilute acid solutions in general use for other classes of steel do not as a rule give a clear structure on this class of material.

In seeking to remedy this confusion by some simple method which would give equal results, the authors attempted to find a well-known and easily obtainable re-agent having a purely chemical action on the steel. One method of structure development which is largely used for certain classes of material is an example of pure chemical action and gives praiseworthy results. This is known as heat tinting. This method is of course impossible of adoption for hardened steels, as by its use their special nature would be completely altered, but the principle involved was selected as the best basis to work up to.

Tests made with many simple oxidizing media only gave disappointing results, and further fields of chemical action were explored until finally a most excellent re-agent was found in sulphurous acid. After deciding upon the best form in which to use the solution, and testing by many different methods, a number of sections, covering practically the whole range of iron and steel metallurgy, were treated with it, and the results must be regarded as extremely satisfactory. It not only provides a medium whereby all the constituents and structures of hardened and tempered steels are clearly differentiated, but gives results of considerable value in the case of standard (eutectic) and supersaturated steels, whilst the constituents of pure pig irons and those containing sulphur and phosphorus are much more clearly developed than by the methods in general use (including heat tinting).

In its present form the method is not successful in steels composed of ferrite and pearlite, but experiments now in progress indicate that a slight modification will make it a useful method of attack on such material. The reason of the non-success lies in the purely chemical nature of the reaction, the ferrite being so deeply pitted almost instantaneously without development of the crystalline junctions that it is only with difficulty distinguished from finely divided pearlite. In this domain, however, dilute nitric acid solution supplies practically all that is required.

The chemical reaction of the method is not completely known, but the

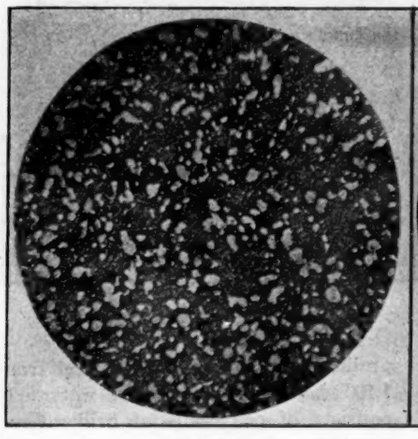


Fig. 1.

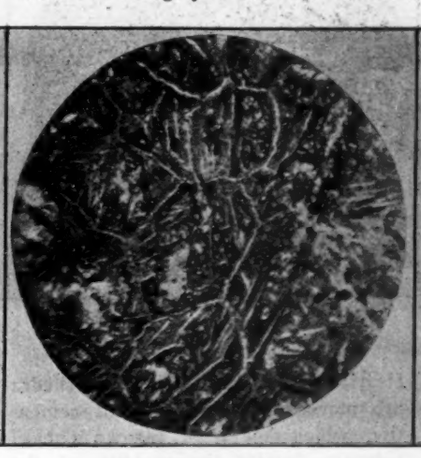


Fig. 2.

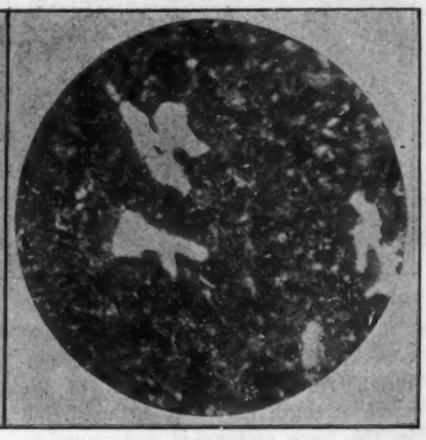


Fig. 3.

[1] Paper presented at the Buxton meeting of the Iron and Steel Institute.
[2] Berlin.
[3] Charlottenburg.

authors intend to take an early opportunity of definitely deciding this question. Present research shows that the metal is dissolved by a somewhat complex reaction with the formation of ferric thiosulphate and ferrous sulphite* (which are soluble and have respectively the formulae Fe_2SO_3 and $FeSO_3$) and of sulphide of iron, FeS, which is deposited upon the parts which are dissolved. The various constituents of steels are acted upon with varying rapidity, and are thus coated with films of iron sulphide of varying thicknesses which permits them to be very easily differentiated. The method is thus in principle that of heat tinting, the films of oxide being replaced by films of sulphide of iron.

The acid used should be as free from sulphuric acid† as possible, and is obtained in the form of a saturated solution of sulphur dioxide in water. The authors' work has shown that the most useful medium is prepared by making a 3 to 4 per cent solution of such an acid in water, in which case etching is complete in from seven seconds to one minute, according to the nature of the material. An alcoholic solution of the same strength may also be used, but in this case etching is not complete for several minutes. The specimen is immersed in the prepared solution face upwards and withdrawn as soon as the polished surface appears matt or frosted, then rinsed in water and dried by means of alcohol and a stream of air in the usual manner. It should be noted that if the solution is allowed to stand in the etching dishes for any length of time in a warm room it rapidly loses its power of attack, owing to the evaporation and oxidation of the sulphur dioxide resulting from the large surface exposed to the atmosphere. For the same reason both concentrated and dilute solutions should be stored in well-stoppered bottles in a cool place.

*Established by the use of ferrum reductum.

†That the reaction is not due to sulphuric acid was proved by careful distillation of SO_2, which was dissolved in alcohol and also in water, these solutions giving exactly the same results as those obtained with the fresh commercial acid.

Some of the Results Obtained.

As illustrations of the results obtained by this method of etching, photomicrographs of the following structures are given:

Fig. 1 shows the structure of a 1.5 per cent carbon steel slowly cooled. It is seen to consist of finely granular pearlite and small, evenly distributed patches of cementite. Magnification, 400 diameters. The cementite remains brilliant whilst the ground mass of ferrite is colored dark brown. The Fe_3C of the pearlite also remains brilliant white as in the case of the cementite.

Fig. 2 shows the structure developed on the same steel after quenching in cold water from 1,100 degrees Cent. The structure is that of the so-called polyhedral austenite. It is clearly seen that these polyhedra are marked out by walls of cementite, which has been thrown out of solution despite the rapidity of the quenching. In parts should be noticed what are known as "needles of martensite" in the austenite. These assume a bright blue tint under this etching. A fine but distinct structure is also to be seen in the "structureless austenite," and as this is also present in the "martensite needles" it seems highly probable that the latter are also austenite, probably with a slightly different orientation or molecular pressure. The cementite again remains brilliant white, and between it and the austenite the first formation of hardenite is seen, the latter assuming a green and smooth appearance. The structure in the austenite is shown through parts remaining pale whilst others are colored pale brown. Magnification, 400 diameters. On etching this section with the dilute hydrochloric acid in general use, such regular results are not obtained. In some cases the cementite is to be seen, whilst in others the "polyhedra" are merely indicated by a dark-colored band. The structure of the martensite needles is not to be seen as they are strongly covered with a dark brown deposit of carbon, and the special structure observed in the austenite is in no wise indicated.

Fig 3 depicts the martensite structure of the same steel when rapidly quenched from 980 degrees Cent., some bright patches of undissolved cementite still remaining. On etching the usual martensitic structure is produced in shades of deep blue and brown, which afford much better contrast than that given by the usual methods of etching. Magnification, 400 diameters.

In Fig. 4 is shown the structure produced by quenching the steel from 1,100 degrees Cent. in hot water. It consists of cell walls of brilliant cementite, pale austenite, and smooth dark-green hardenite. When hardenite occurs under such conditions it is by many authors mistaken for troostite, despite the at least clear difference in the hardness of these substances. Since austenite is only changed to troostite by tempering at 400 degrees Cent., it seems highly improbable that they could occur so close together with the above treatment. The probable reason for this mistake lies in the fact that with the usual etching media both are rapidly deeply colored through liberated carbon, but with the proposed medium

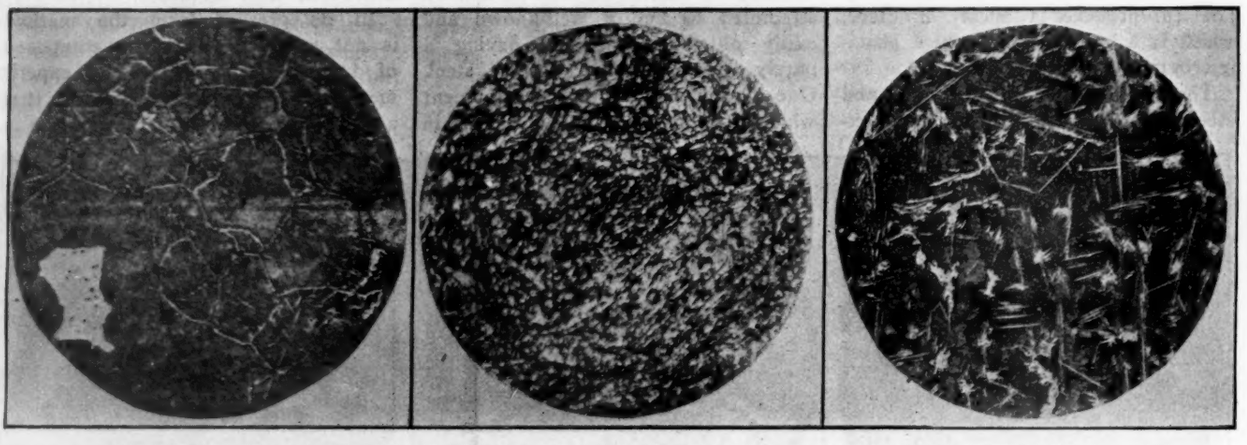


FIG. 4. FIG. 5. FIG. 6.

a micrographic difference is clearly shown (see below). Magnification, 400 diameters.

Fig. 5 shows the structure produced by tempering one of the martenistic pieces of the same steel at 300 degrees Cent. With the usual etching the whole section becomes colored deep brown or black through liberation of hardening carbon. With sulphurous acid etching the ground mass is colored pale brown, and in the case of martensitic steels still shows the remains of the original structure. Through the whole area of the section a number of minute granules are evenly distributed, which, under considerable magnification, are seen to be very finely divided cementite which has been precipitated by the tempering. Such a structure is easily differentiated from the previously described hardenite, which appears to be a structureless constituent. The photomicrograph shows the troostite under a magnification of 400 diameters.

Fig. 6 shows an austenitic structure produced by quenching a steel with 2 per cent of manganese. On etching with the usual media a uniform pale structure is produced in which the polyhedra are dimly seen. The proposed etching, however, clearly resolves three different constituents. Precipitated cementite remains brilliant, and is seen as long needles and patches, and in the case of the usual etching remained slightly in relief and gave the polyhedric appearance. The ground mass is divided into two components, one of which assumes a much darker brown color than the other, but as to the meaning of which the authors are unable to express definite opinion until further research has been completed. Magnification, 150 diameters.

Fig. 7 depicts the structure obtained from a rapidly cooled white iron containing 3.5 per cent carbon. The usual structure is well brought out, and the internal eutectic structure is clearly to be seen Magnification, 240 diameters.

Fig. 8 shows the structure of a pig iron such as is commonly used in Germany for the basic Bessemer process. The approximate composition is 3 per cent carbon, 0.25 per cent silicon, 2.5 per cent phosphorus, and 2.5 per cent manganese. The iron thus is of nearly a white iron nature, and the photograph clearly depicts the usual white iron eutectic and a few plates of graphite, whilst in the fields of cementite the phosphide eutectic is seen. The latter assumes a brown color on etching. Magnification, 150 diameters.

Fig. 9 shows the structure of a specially prepared pig iron containing high percentages of sulphur and manganese. By no other method was it possible to develop upon this material a clear structure, as a treatment which rendered any one constituent clearly, invariably gave such a bad appearance to the others that photography and exact research were out of the question. In the reproduction cementite and eutectic are shown in the usual manner, whilst the sulphide of manganese is darkly colored. In the original the latter assumes a dark blue coloration.

These examples will suffice to show the wide application and results obtained by the process. In the cases where new structures have been observed they are only briefly noted, as the exact explanations cannot be given from the present knowledge. The authors are now at work upon the whole subject of these constituents, and hope in a short time to communicate a larger paper on the subject. It has, however, seemed advisable to submit the present paper in order that those who are interested in the subject may experiment for themselves with what seems to be a highly important etching medium, as only in this way can a new method be thoroughly tested and science aided on the lines so desirable for its advancement.

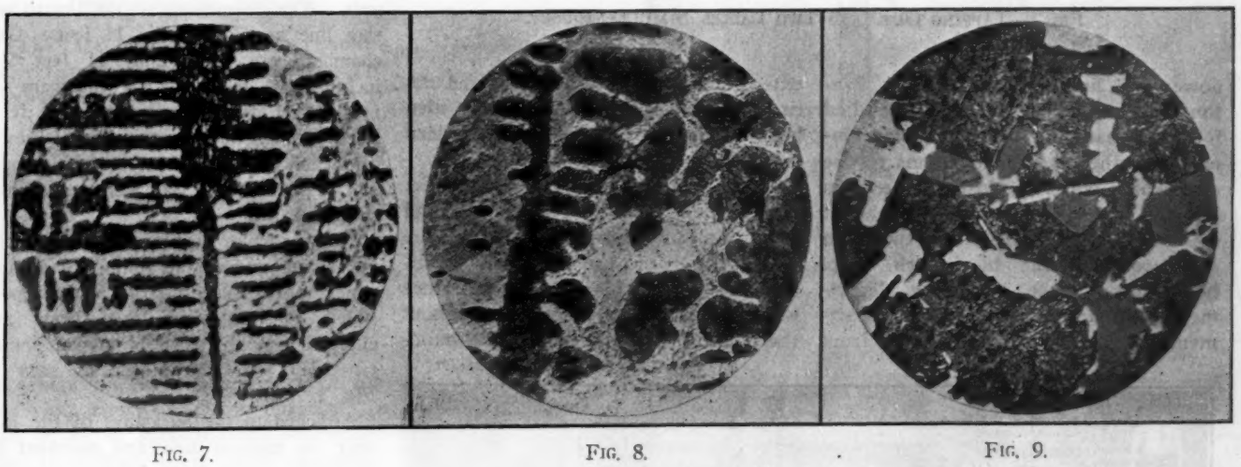


FIG. 7. FIG. 8. FIG. 9.

New Plant of Universal Machine Screw Co.

Full operations have been inaugurated by the Universal Machine Screw Co., in its newly completed plant in Hartford, Conn., which embodies in its design all the up-to-date features essential to the production of automatic machinery. The plant has been fitted out with strictly modern equipment and additional machinery which is about to be installed will materially increase the output of the present works. Special attention has been given to hygienic features and to the comfort of the workmen.

The new plant has a frontage of 470 feet along the main tracks of the New York, New Haven & Hartford Railroad with ample room for extension which the company has provided for in its plans for the future. The buildings are of slow-burning mill construction with brick and concrete walls and are equipped with a modern sprinkler system for fire protection. The main shop is 120 feet wide by 200 feet long, well ventilated and especially well lighted through the saw tooth type of roof construction. In the center of the main manufacturing floor are a large stock room, tool room, foreman's room, belt room, motor and oil rooms, placing supervision and supplies convenient to the manufacturing and production departments. The entire floor is concrete and the equipment and location of toilet and wash rooms insure excellent sanitary conditions.

The machinery is all motor driven, the current being supplied by the local

FIG. 1—TAPPING OUT INTO TWO LADLES SIMULTANEOUSLY.

power and lighting company. A five-ton traveling crane has been installed for rapid handling of finished machinery from the assembling rooms to the cars which will run close to the main building upon a special siding about to be laid. An extension of the main shop contains the blacksmith shop. boiler room, case hardening department, shipping and receiving departments and grinding room. A front extension, 30 x 70 feet, is devoted entirely to the offices, which have also been equipped in the most modern manner.

The Universal Machine Screw Co. was formed about five years ago and began on an unpretentious scale the manufacture of the Spencer multi-spindle automatic screw machines which are now well known throughout the country. In addition to the building of these machines, the company has reserved a large space in the new plant for the operation of its own machines in the manufacture of special screws of all kinds, nuts, bolts and special metal parts. The officers of the company are as follows: President, Charles Phelps, Rockville, Conn.; vice president, Thomas W. Russell, Hartford; secretary and treasurer, F. Goodwin Smith, Hartford; assistant secretary and treasurer, R. Hakewessell, Hartford.

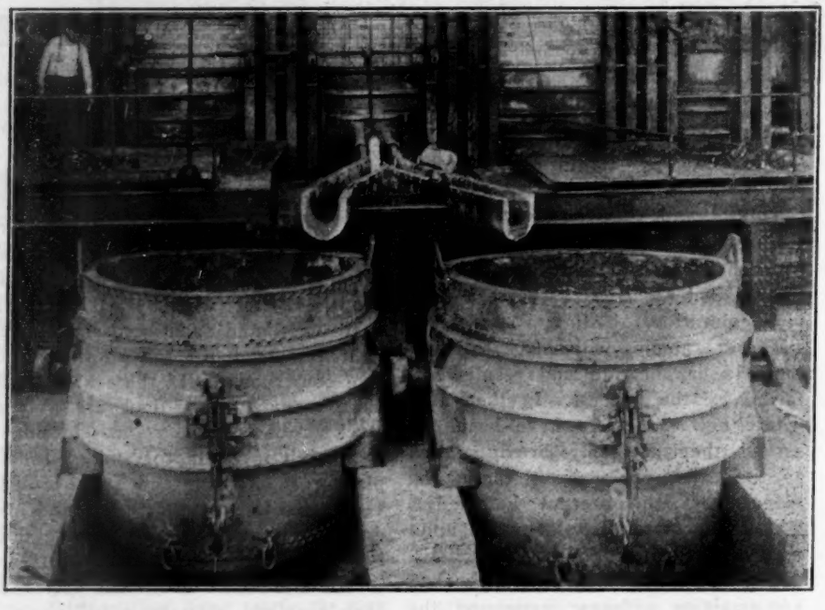


FIG. 2—THE DUPLEX TAPPING DEVICE, SHOWING METHOD OF CONTROL.

Unusual Run of an Open-Hearth Furnace

In the fall of 1909, the Phoenix Iron Co., Phoenixville, Pa., enlarged its steel plant by an additional open-hearth furnace. This furnace has just completed its year and as the results are somewhat unusual, they will prove of interest to open-hearth manufacturers.

The furnace is of the 50-ton standard type and was run on producer gas and all the raw material was charged cold (hot metal not being available). The product, which was basic structural steel, amounted to 43,900 gross tons ingots. The dimensions of the hearth on slag line are 36 feet by 14 feet. Gas chambers are 18 feet by 11 feet 6½ inches by 6 feet, and air chambers 18 feet by 11 feet 6½ inches by 9 feet. Each gas chamber contains 5,500 9-inch brick and each air chamber 8,500—making a total of 28,000 standard 9-inch checker brick.

The particular feature of this furnace (operating under Maccallum patents and which makes such a large product possible), is that very large heats are charged and the steel is tapped simultaneously into two ladles, as seen in Fig. 1.

Attached to the buckstays of the furnace on tapping side and operated by levers at a convenient distance from the ladles, is a device, shown more clearly in Fig. 2, which controls the flow of steel into either ladle. The usual charge for the furnace is 335,000 pounds of pig and scrap, and the yield of ingots varies from 135 to 140 gross tons. The best weekly record is 1,176 gross tons, and the largest heat tapped—150 gross tons. The usual number of men operate the furnace that are required to operate an ordinary 50-ton furnace, and a large saving has been effected in labor, fuel and repairs.

The Bay View Foundry Co., Sandusky, O., advising respecting some new construction, says that it contemplates only a small addition to its present core department, the new construction being two stories, brick and steel, 25 x 75 feet.

THE FRICK ELECTRIC REDUCTION FURNACE[1]

The Largest Example of the Electric Smelting Furnace With Comparative Costs of Operation

The Frick furnace for the reduction of ores belongs to the type of electric furnaces generally called "resistance furnaces," because of the material to be treated being used as a resister, heated by an electric current passing through it.

The characteristic arrangement of this furnace refers to the electrodes. These are surrounded by loose charcoal or coke, and thus not only protected from combustion by the ore, but also insulated against heat losses, which are considerably reduced.

The furnace may be worked with a single or polyphase current. Generally a two-phase current is preferable, because it allows the use of two independent circuits of the greatest possible resistance.

Description of Furnace.

The accompanying drawing shows a furnace of 2,000 kilowatts. The furnace consists of:

(1) A wide circular reaction and melting chamber, covered with a vault-like roof.

(2) One central feeding shaft, in which the ore and part of the reducing coal are fed in a similar way as in an ordinary blast furnace.

(3) Two or more smaller shafts for the introduction of the electrodes. These latter shafts are provided with openings, through which part of the reducing agent, coke or charcoal, is fed so as to surround the electrodes and to protect them from oxidation. For convenience, these openings are connected by means of small funnels with the top floor, so that the coal may be supplied from there to the electrodes.

The furnace represented on the drawing is designed to be worked with a two-phase current, the two phases being independent of each other.

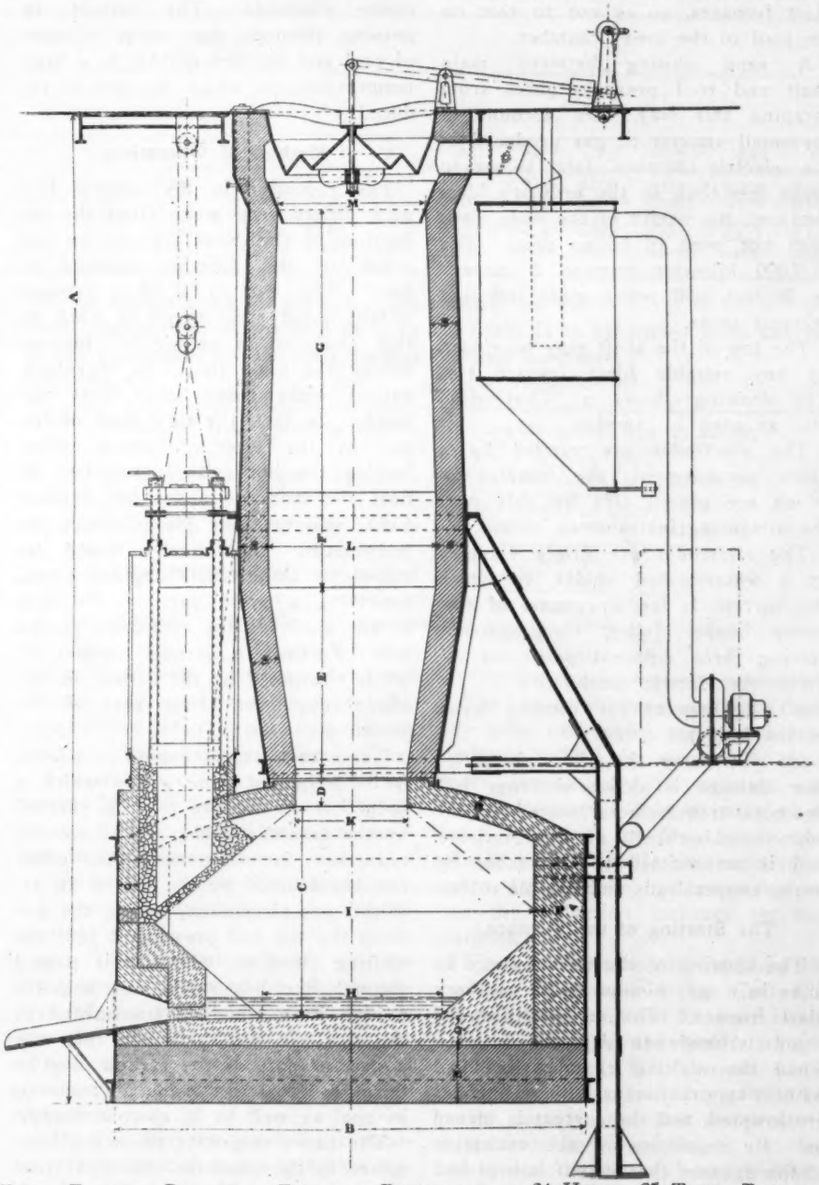
The whole furnace is encased by a strong steel plate construction.

The reaction chamber is lined with magnesite to withstand the high temperature, which may arise. The lining is of such composition as to be a very poor conductor for electricity even at high temperatures, a fact of great importance in furnaces of this kind.

The diameter of this chamber has to be comparatively large to obtain a sufficiently high resistance and to avoid a too excessive current. This is the opposite of the ordinary blast furnace practice, according to which the furnace is made narrower in the melting zone, mainly with a view to enabling the blast to reach the center of this zone.

The lower part of the melting chamber, in which the produced pig is collected, is made narrower so as to get a sufficient depth of the iron bath. The arrangements for tapping pig and slag are the same as in the ordinary blast furnace.

Besides the openings in the wall for tapping of pig and slag, openings are provided, one in front of each electrode and one or more between the electrodes. Through the former the charcoal or coke round the electrode may be raked out when an exchange of electrodes has to be made. The latter may serve for the introduction



FRICK ELECTRIC REDUCTION FURNACE. PRODUCTION IN 24 HOURS, 25 TONS; POWER CONSUMPTION, 2,000. K. W.

[1]Abstracted from Bulletin No. 3, Department of Mines, Canada, on "Recent Advances in the Construction of Electric Furnaces," by Dr. Eugene Haanel.

of gas taken from the furnace top by a ventilator, with the purpose of using the gas as a heat transmitter so as to increase the extension of the hot zone, within which a reduction of the ore by carbonic oxide can take place. This circulation of the gas was first proposed by Harmet, and the idea was recommended by the author in his lecture before "Jern-Kontoret" in Stockholm, May, 1905.

The main shaft is carried by a special steel beam construction, in a similar way to that used in ordinary blast furnaces, so as not to rest on the roof of the lower chamber.

A sand closing between main shaft and roof prevents gases from escaping this way. On account of the small amount of gas produced in the electric furnace (six to seven times less than in the ordinary blast furnace), the height of the main shaft does not need to be so great. For a 2,000 kilowatt furnace, 6 meters, or 20 feet, will prove quite sufficient in most cases.

The top of the shaft may be closed by any suitable blast furnace top. The drawing shows a "Charleville" top, as used in Sweden.

The electrodes are carried by a block arrangement, the handles of which are placed side by side near the measuring instruments.

The electrodes are firmly clamped by a water-cooled holder, to which the current is led by means of two heavy copper tubes, simultaneously serving three different purposes:

(1) As electric conductors.

(2) To convey the cooling water to the holder.

(3) To carry the electrodes.

The current is delivered from one or more transformers, placed in the near neighborhood of the furnace, and is transmitted to the tubes by heavy copper leads and flexible cables.

The Starting of the Furnace.

The starting of the furnace may be done in a way similar to an ordinary blast furnace. First, a small fire of wood is made to dry the furnace. Then the melting chamber is filled with coke or charcoal, the electrodes are lowered, and the current is turned on. By regulation of the excitation of the dynamo the current is kept low in the beginning, so as not to increase the temperature too quickly.

When the temperature in the chamber has reached 1,500 degrees Cent., the lining has become hard and the furnace is ready to work.

To burn off part of the coal, air may be admitted through the tap-holes, precaution being taken all the time that the electrodes are protected.

Now, the furnace is filled with alternate layers of coal and ore with lime; the current is turned on, and raised until full power is reached.

The dimensions of the electrodes and the surrounding layer of coal, which acts as a heat-insulator, are so diminished that the highest temperature will be produced only at the bottom of the electrode, from where the current will find the easiest way and least resistance across to the opposite electrode. The current, in passing through the coarse mixture of coal and ore, brings this to a high temperature, in which the ore is reduced.

Method of Operation.

The reduction in the electric furnace differs very much from the reduction in the blast furnace on account of the different sources of heat. The gas in a blast furnace weighs about eight times as much as that produced in an electric furnace during the same time. It, therefore, carries eight times more heat upwards. In fact, the total heat of the gas in the electric furnace when leaving the hot zone is sufficient to heat the stock to about 600 degrees Cent., whereas in a blast furnace the temperature theoretically could be raised to about 3,800 degrees Cent., providing a great part of the heat is not used for the reduction of the ore. Further, a certain amount of air is consumed by the carbon in rising through the lower part of the shaft.

These two factors extend in a blast furnace the hot zone within which a reduction of the ore can be effected by the carbonic oxide. In an electric reduction furnace the same effect can be obtained by the use of an artificial gas circulation, taking the gas from the top and pressing it into the melting chamber, where it is passed through the hot stock, and acquires a high heat, which is transmitted to the stock in the shaft. In this way a greater part of the carbon may be burnt to dioxide, causing an economy in coal as well as in electric energy.

The gases evaporate the water contained in the stock in the upper part of the shaft. The water vapors in the circulating gas, when passed through the heat zone, are dissociated and form another source of heat in the shaft, thus increasing the effect of the circulation. In cases where pulverized ore has to be treated, it might be preferable not to use any gas circulation, or only a moderate one, so as not to run the risk of the ore dust being carried off with the gas. If the prices of power and coal are high, however, it may be economical to use the gas circulation and to have the ore dust briquetted. The gas produced in an electric reduction furnace possesses a much higher calorific value than the gas from a blast furnace, being 1,600 to 2,000 calories per cubic meter at 15 degrees Cent. against 700 to 900 calories in a blast furnace. The gas is thus as good as best producer gas, and can be used for all purposes, equally well for re-heating furnaces as for open-hearth furnaces. Sufficient gas is produced for converting the produced pig into steel, if brought in molten condition into an open-hearth furnace. Such a combination will, in many cases, prove most useful, and may be further improved by finishing the steel in an electric furnace.

During the first part of a run the electrodes are allowed to touch or enter into the stock, so as to gradually get the inner edge burnt away. When, however, their under surfaces have assumed a shape of the same slope as the stock, they should not be allowed to touch the stock, but should be kept a few inches above it, so that the coal from the shafts, surrounding the electrodes, gets an opportunity of rolling down between the stock and the ends of the electrodes. These will thus be perfectly protected from being oxidized. Their life will be considerably longer than in furnaces where the electrodes enter into or touch the ore. The wear of the electrodes is due partly to the oxidizing effect of the ore and partly to the mechanical friction of the descending stock. Both these causes are avoided. Only a slight friction will take place between the electrodes and the coal in fine condition, surrounding them. The heat insulation round the electrodes has, further, the good effect of protecting the walls and the roof against any excessive heat.

Consumption of Electrodes.

On account of the comparatively low temperature prevailing in the main shaft, it is of little value to use thick walls. The thickness of the wall ought only to provide sufficient safety against the wear of the descending stock. This wear is considerably less than in an ordinary blast furnace through the slow downward speed of the stock, the volume of which per ton of pig is slightly more than one-third of that in a blast furnace. On account of the

low height of the furnace, the pressure of the stock on the walls is also less than in a blast furnace.

The electrodes, although they are protected against oxidation and excessive wear, will in time wear away. They have to be lowered at long intervals. When finally so worn that the holders become exposed to a too high heat, a fresh electrode may be clamped on the top of the old one, which thus is completely consumed. The clamping together of the electrodes is very much facilitated by the free space round the electrodes when passing through the roof of the furnace. Cheap iron or steel clamps, which are allowed to melt down, are used. To insure a good contact between the two electrodes, the joint is filled with a good conducting paste of iron, steel, or graphite in powder. The sheet-casing around each electrode can quickly be removed, if a new electrode is to be inserted.

Coal Consumption.

The consumption of coke or charcoal is determined by the carbon necessary for the reduction of the metalloids and by the carbon in the pig.

The amount of carbon for reduction varies according to the degree at which the carbonic oxide can be utilized for the reduction, and which is indicated by the proportion between the carbon burnt to carbonic oxide and the carbon burnt to carbonic acid, or, what is the same, the proportion of the volume of CO to the volume of CO_2 in the gas.

If $CO/CO_2 = k$, so may the amount of carbon necessary to reduce

1 kg. Fe from Fe_2O_3 be put $= 0.428 \frac{(1+k)}{1.33\ (2+k)}$
1 kg. Fe from Fe_3O_4 be put $= 0.381$ "
1 kg. Si from SiO_2 be put $= 1.142$ "
1 kg. Mn from MnO be put $= 0.291$ "
1 kg. P from P_2O_5 be put $= 1.29$ "

From the ore to be used it is easy to arrive at an approximate analysis of the pig. The value of "k" depends on varying conditions, as stated above. With a good gas circulation "k" should attain the value of 2 to 2.5. With no gas circulation "k" may be above 4.

The accompanying Table I gives the amount of carbon necessary at different "k" for the above-named metalloids.

The carbon in the pig depends upon the amount of excess carbon in the melting zone, and may be varied between 1 and 4 per cent. There will probably be required a much more accurate weighing and analysis of ore and coal to obtain regular composition of the pig than in an ordinary blast furnace, where an excess of carbon must be present. The total consumption of charcoal or coke is easily calculated from their carbon content.

The weight of the coal varies between 240 and 340 kg. per 1,000 kg. of pig, to the greatest extend depending on the value of k.

TABLE I.
$CO : CO_2 = k$.

$\frac{1+k}{1.33\ (2+k} = K)$

Kg C required for reduction of:	100	50	9	6.5	5	4	3	2.5	2.0	1.5	1.0	0.67	0
1 kg. Fe from Fe_2O_3 = 0.428K.....	0.319	0.312	0.293	0.284	0.2765	0.267	0.257	0.25	0.241	0.229	0.214	0.201	0.161
1 kg. Fe from Fe_3O_4 = 0.381K.....	0.284	0.278	0.261	0.253	0.2465	0.238	0.229	0.222	0.214	0.204	0.1905	0.179	0.143
1 kg. Si from SiO_2 = 1.142K.....	0.852	0.834	0.783	0.758	0.739	0.715	0.686	0.667	0.643	0.613	0.572	0.538	0.430
1 kg. Mn from MnO = 0.291K.....	0.217	0.212	0.199	0.193	0.188	0.182	0.175	0.170	0.164	0.156	0.146	0.137	0.1095
1 kg. P from P_2O_5 = 1.29 K.....	0.962	0.941	0.883	0.855	0.835	0.807	0.775	0.753	0.725	0.692	0.645	0.606	0.485

Theoretical Power Consumption.

Under this item are to be considered:

(1) The reduction heat, or the heat energy absorbed in the reduction of the metalloids, after deducting the heat, developed by the oxidation of the carbon that absorbs the oxygen, made free through the reduction.

(2) The heat to expel the carbonic acid from carbonates and the water from hydrates.

(3) The melting heat of the pig.

(4) The melting heat of the slag.

(5) The sensible heat carried away by the gases.

The reduction heat (1) has to be based on the figures relating to the heat of formation that have been measured by various experimenters. These figures differ to a certain extent. The subsequent calculations are based on the following mean values:

1 kg. C.	+ 1.33 kg.	O = 2.33 kg.	Co	= 2,470 kg. cal.	= 2.88	K. W. H.
1 kg. C	+ 2.67 kg.	O = 2.67 kg.	Co_2	= 8,080 kg. cal.	= 9.42	K. W. H.
1 kg. Fe	+ 0.286 kg.	O = 1.286 kg.	FeO	= 1,350 kg. cal.	= 1.575	K. W. H.
1 kg. Fe	+ 0.381 kg.	O = 1.381 kg.	Fe_2O_3	= 1,650 kg. cal.	= 1.925	K. W. H.
1 kg. Fe	+ 0.428 kg.	O = 1.428 kg.	Fe_3O_4	= 1,800 kg. cal.	= 2.1	K. W. H.
1 kg. Mn	+ 0.291 kg.	O = 1.291 kg.	MnO	= 1,730 kg. cal.	= 2.02	K. W. H.
1 kg. Si	+ 1.142 kg.	O = 2.142 kg.	SiO_2	= 7,830 kg. cal.	= 9.13	K. W. H.
1 kg. P	+ 1.29 kg.	O = 1.29 kg.	P_2O_5	= 5,900 kg. cal.	= 6.88	K. W. H.

Table II gives the theoretical power consumption necessary for the reduction of 1 kg. of the various metalloids after deduction of the heat developed by the carbon at different values of k.

Table II is calculated from the following formulae:

The reduction of:

1 kg. Fe from Fe_2O_3—ore requires 2.1 $\frac{-0.428\ (2.88k + 9.42)}{1.33\ (k+2)}$ K. W.

1 kg. Fe from Fe_3O_4—ore requires 1.925 $\frac{-0.381\ (2.88k + 9.42)}{1.33\ (k+2)}$ K. W.

1 kg. Si from SiO_2 —ore requires 9.13 $\frac{-1.142\ (2.88k + 9.42)}{1.33\ (k+2)}$ K. W.

1 kg. Mn from MnO —ore requires 2.02 $\frac{-0.29\ (2.88k + 9.42)}{1.33\ (k+2)}$ K. W.

1 kg. P from P_2O_5 —ore requires 6.88 $\frac{-1.29\ (2.88k + 9.42)}{1.33\ (k+2)}$ K. W.

The heat to expel carbonic acid (2) from carbonates and water from hydrates. This is, as a rule, made more economically in separate gas-heated furnaces. Only in cases where small quantities of lime are needed which do not justify the erection of extra furnaces, it is economical to use the reduction furnaces for this purpose.

The heat absorbed in expelling the carbonic acid from 1 kg. CaO CO_2 may be taken at 0.514 kilowatt hours, and in expelling the water from 1 kg. CaO H_2O at 0.24 kilowatt hours.

The melting point of pig (3) depends mostly on the temperature. From various experiments it has been found that the heat contained in molten pig is very well expressed by the formulae:

218 + 0.29 (t°—1,200°) calories per kg.
or 255 + 0.388 (t°—1,200°) kilowatt hours per [ton.

At 1,200° the heat is = 255 kilowatt hours [per ton.
At 1,300° the heat is = 294 kilowatt hours [per ton.
At 1,400° the heat is = 333 kilowatt hours [per ton.

The melting heat of the slag (4)

varies very much with varying composition. A slag suitable for a basic furnace should have the composition of a singulosilicate, the melting heat of which may be assumed to be about

440 + 0.40 (t°—1,200°) calories per kg.
or 515 + 0.47 (t°—1,200°) kilowatt hours per ton.

At 1,200° the heat is = 515 kilowatt hours per ton.
At 1,300° the heat is = 562 kilowatt hours per ton.
At 1,400° the heat is = 609 kilowatt hours per ton.

The amount of slag depends on the purity and composition of the ore, and can be easily calculated from the analysis of the ore, the coal, and the lime as shown in the examples given later on.

The sensible heat of the gases (5) depends on the temperature at which the gases leave the furnace and on the amount of water vapor contained in them.

The gases contain—if the furnace is worked without gas circulation—practically only CO and CO_2 together with the water which is evaporated in the upper part of the furnace from the damp stock. Very little hydrogen or hydrate of carbon coming from the charcoal or coke will be present.

If the gas circulation is used, greater amounts of hydrogen and hydrates of carbon will be formed by the passage of the steam through the highly heated coal in the melting zone, part of which will reburn in the shaft, while one part will be carried away by the head gases.

The sensible heat of the steam in the gases at a temperature of t degrees Cent. is:

600 + 0.48 t degrees calories per 1 kg.

The sensible heat of the gases can be taken to be about 0.25 × t degrees calories per kg., although for very accurate calculations the increase of the specific heat with the temperature ought to be taken into consideration.

The water in the gases is exclusively derived from the wet stock, and has to be calculated from the analysis.

The weight of the dry gases, which depends on the value of k and on the carbon consumption necessary for the reduction, is:

$$= \frac{1}{1+k} \text{ (2.33 k + 3.67) kg. for 1 kg. C.}$$

The total theoretical power consumption varies generally between 1,200 and 1,350 kilowatt hours per ton, exclusive of the heat absorbed by the slag, which may be anything between 100 and 300 kilowatt hours per ton of pig, and the heat absorbed in expelling the water of the hydrates and the carbonic acid from the limestone, which may add up to 250 more kilowatt hours per ton of pig.

The total theoretical power consumption may thus vary between 1,300 and 1,650 kilowatt hours per ton of pig, if burnt dry lime is used, which latter figure might reach 1,900 kilowatt hours if crude limestone is used. These figures are based on an ore of not less than about 57 per cent Fe. In specific cases it is necessary to make exact calculations, based on the analysis of the raw materials and the products.

The radiation losses can only be calculated from case to case. These losses occur partly through the walls and partly through the electrodes. The losses through the walls may be reduced by insulation, but the gain in less heat radiation in a reduction furnace where the hearth is difficult to inspect and to repair is counterbalanced by the greater wear of the hearth.

A greater saving is obtained through the insulation of the electrodes by the surrounding coal in pieces or powder. In the 2,000 kilowatt furnace shown on the accompanying drawing the total losses will be about 320 to 370 kilowatts.

The practical power consumption will

$$\text{be} = \frac{\text{total power}}{\text{total power-radiation loss}}$$

The efficiency of the 2,000 kilowatt furnace will thus be:

$$\frac{2{,}000 - 370}{2{,}000} = \frac{1{,}630}{2{,}000} = 0.815 \text{ or } 81.5 \text{ per cent.}$$

The practical power consumption will

$$\text{be} = \frac{\text{the theoretical power consumption}}{\text{efficiency}}$$

and will thus in a 2,000 kilowatt furnace vary between $\frac{1{,}300}{0.815}$ = 1,600 kilowatt hours per ton pig, and $\frac{1{,}650}{0.815}$ = 2,030 kilowatt hours per ton pig, if burnt lime is used, but may increase to $\frac{1{,}900}{0.815}$ = 2,340 kilowatts if limestone is charged.

Smaller furnaces give a lower efficiency, and thus require a greater practical power consumption.

Volume and Heat Value of Head-gases.

The volume of gas produced from 1 kg. Cent. is = 2.03 cubic meters at 15 degrees Cent.

The total volume of gas per ton of pig depends mainly on the value of "k" or the proportion between CO and CO_2

for k = 1 1.5 2 2.5 3 4
is the approximate total volume of gas in cbm. per ton pig
if ore = Fe_2O_3
470 497 518 537 550 568
if ore = Fe_3O_4
427 450 470 485 498 515
the heat value of 1 cubic meter of gas at 15 degrees Cent. in calories
1,380 1,650 1,840 1,970 2,070 2,210
and the total heat value of the head gases at 15 degrees Cent. in K. W. H. per ton pig,
if ore = Fe_2O_3
755 956 1,115 1,230 1,325 1,465
if ore = Fe_3O_4
683 867 1,006 1,110 1,198 1,328

The heat value per cubic meter of the gases is thus generally superior to that of ordinary producer gas. If k is above 2 the gases contain sufficient heat to convert the pig into steel in an open-hearth furnace.

The electrodes have to carry heavy currents of 12 000 to 15,000 amperes, and have to be of big cross-sections, so as to avoid too large losses.

In a 2,000 kw. two-phase furnace, with 4 electrodes, each of these has to be 600 x 600 mm. if made of retort carbon. If graphitized electrodes are used, a smaller cross-section is preferable.

The heat developed by the current in the electrodes is carried away by the water, used to cool the holders.

The amount of heat lost through the electrodes is in this furnace less than in other furnaces of similar type, on account of the heat-insulation obtained by the surrounding coal.

The transformers are placed on a floor at such a height that they will not interfere with the tapping of slag and pig, and that the copper connections become as short as possible.

The costs of production depend

TABLE II.
CO: CO_2 = k.

K. W. H. required for reduction of:	100	50	9	6.5	5	4	3	2.5	2.0	1.5	1.0	0.67	0
1 kg. Fe from Fe_2O_3	1.163	1.162	1.068	1.038	1.004	0.985	0.940	0.914	0.880	0 842	0.786	0.734	0.585
1 kg. Fe from Fe_3O_4	1.091	1.089	1.005	0.977	0.948	0.930	0.891	0.873	0.843	0.805	0.757	0.709	0.580
1 kg. Si from SiO_2	6.63	6.63	6.37	6.29	6.195	6.14	6.03	5.965	5.875	5.76	5.61	5.405	5.08
1 kg. Mn from MnO	1.383	1.382	1.319	1.296	1.275	1.258	1.229	1.212	1.188	1.162	1.123	1.086	0.99
1 kg. P from P_2O_5	4.06	4.06	3.77	3.68	3.57	3.50	3.38	3.305	3.21	3.08	2.92	2.76	2.32

first of all on the price of the electric energy.

In comparing the electric reduction furnace with the ordinary blast furnace, it is necessary to take into consideration not only the costs of the current compared with those of the corresponding amount of coke or charcoal, but also the facts which put the electric furnace in a better position than the blast furnace. The electric furnace can without any inconvenience treat ore in powder. The coke and coal may also contain great amounts of cheap dust without inconvenience. The purity of the coal is of much less importance on account of the quantity only, being about one-third of that in a blast furnace. The conditions in an electric reduction furnace are also very favorable for the elimination of sulphur, as in the melting zone a strong reducing atmosphere and high temperature prevail, which are the conditions for an absorption of the sulphur by the lime according to the reaction: $CaO + S + C = CaS + CO$.

The quality of the electric pig will thus in many cases be superior to that produced in an ordinary blast furnace from the same raw materials.

A general rule as to the economical possibility of the electric reduction furnace cannot be produced.

Each case must be considered on its merits. To give an idea, a calculation of two instances may be given. The calculations are based on the following analysis and assumptions:

Material.		Plant designed for Sweden. Per cent.	America. Pulverized. Per cent.
Ore	Fe_3O_4	91.5	83
	MnO	0.2	1.5
	MgO	1.5	....
	CaO	2.0	2.0
	Al_2O_3	0.8	....
	SiO_2	2.8	10.5
	P_2O_5	1.2	....
	H_2O	....	3.0
	Fe	66.3	60
Lime	MgO	1.7	1.7
	CaO	96.5	96.5
	Al_2O_3	0.9	0.9
	SiO_2	0.9	0.9
Charcoal	C	84	84
	H_2O	13	13
	Ashes	3	3
Pig	Fe	96	96
	C	3	3
	Si	0.2	0.5
	Mn	0.2	0.5
	P	0.6	....

Slag containing	0.2 per cent Fe from ore. Kg.	Per cent.	1 per cent Fe from ore. Kg.	Per cent.
FeO	2.57	2	12.86	2.66
MnO	0.4	0.30	17.20	3.56
MgO	22.8	17.8	4.40	0.91
CaO	63.2	49.3	284.30	58.90
M_2O_3	12.21	9.6	2.30	0.77
SiO_4	22.81	17.8	161.50	33.50
P_2O_5	4.1	3.2	.....	.....
	128.09	100.00	482.66	100.00

Weight of ore per ton of pig	1,450 kg.	1,617 kg.
Value of $k = CO/CO_2$	2.5	4.0
Weight of carbon per ton of pig	kg.	kg.
For reducing Fe	213.00	228.00
For reducing Mn	0.34	0.9
For reducing Si	1.33	3.6
For reducing P	4.50	...
For reducing Fe_3O_4 to FeO slag	0.11	0.55
For reducing carbon in pig	30.0	30.00
	249.28	263.05

	Sweden.	America.
	kg.	kg.
Weight of charcoal per ton pig	297	314
Weight of slag per ton pig from ore and lime	128.0	482.66
Weight of slag per ton pig from ashes	9.0	9.34
	137.0	492.00
Theoretical power consumption per ton pig:	Kilowatt hours.	
For the reduction	879.7	929.1
For melting 100 kg. pig and heating to 1,400°	333.0	333.0
For melting of 137 resp. 492 kg. slag	83.4	298.0
For evaporation of water at 100°	29.0	66.7
For heating of head gases to 100°	14.9	15.0
	1,340.0	1,641.8
Mean power in kilowatt	1,600	2,000
Radiation losses	370	370
Efficiency of furnace in 1 per cent	76.9	81.5
Weight of head gases per ton of pig	600 kg.	608 kg.
Volume of head gases per ton of pig	448 cbm.	473 cbm.
Heat value of head gases per ton of pig	1,970	2,210 calories.
	Sweden.	America.
Practical power consumption per ton of pig in kilowatt hours	1,743	2,020

Costs of ore, lime, charcoal, and electric energy for 1 ton of pig:

(a) for Swedish furnace.

1,480 kg. ore at 12 kr. (Swedish)	= 17.80 kr.	= 19.60 sh.
347 kg. lime at 16 kr. (Swedish)	= 0.57 kr.	= 0.60 sh.
297 kg. charcoal at 20 kr. (Swedish)	= 11.90 kr.	= 13.10 sh.
1,743 kilowatt hours at 0.006 kr	= 10.46 kr.	= 11.50 sh.
	40.70 kr.	= 44.80 sh.

(b) for American furnace.

1,617 kg. ore sand at $1.85	$3	= 12.90 sh.
261 kg. lime at $0.4	$0.105	= 0.45 sh.
314 kg. charcoal at $0.8	$2.51	= 10.80 sh.
2,020 kilowatt hours at $0.075	$1.515	= 6.50 sh.
	$7.130	= 30.65 sh.

The costs for electrodes will be exceedingly small and may probably be kept below $0.18 = 0.6 sh. = 0.54 kr. per ton of pig.

Staffordshire Iron and Steel Institute

The Staffordshire Iron and Steel Institute opened its autumn session at Dudley, Oct. 15, with an address by the president, Walter Macfarlane, one of the most popular and successful metallurgical tutors in Great Britain. There was a very large attendance, presided over by the vice president, Isaac G. Lester. The address was illustrated with excellent limelight views, showing typical blast furnaces, mills, electric furnaces, and leviathan ships.

Mr. Lester pointed out the further evidence given as to the reversion from steel to wrought iron for certain classes of work, which had brought with it a difficulty of obtaining puddlers, especially in the west of Scotland. He understood that in the United States, mechanical puddling had been resorted to. The system was not exactly the Banks process, but something similar, by means of which they got from the furnaces balls weighing from 1,000 to 1,500 pounds. That weight was much greater than could possibly be handled by manual labor. The speaker expressed his satisfaction that, while gigantic plates and other products were being obtained in the north of England and elsewhere, they were largely produced by means of rolls made in Staffordshire. Some of these were 30 tons in weight.

J. W. Hall considered that probably the progress of the next 50 years would consist mainly in applications of electricity for heating and driving.

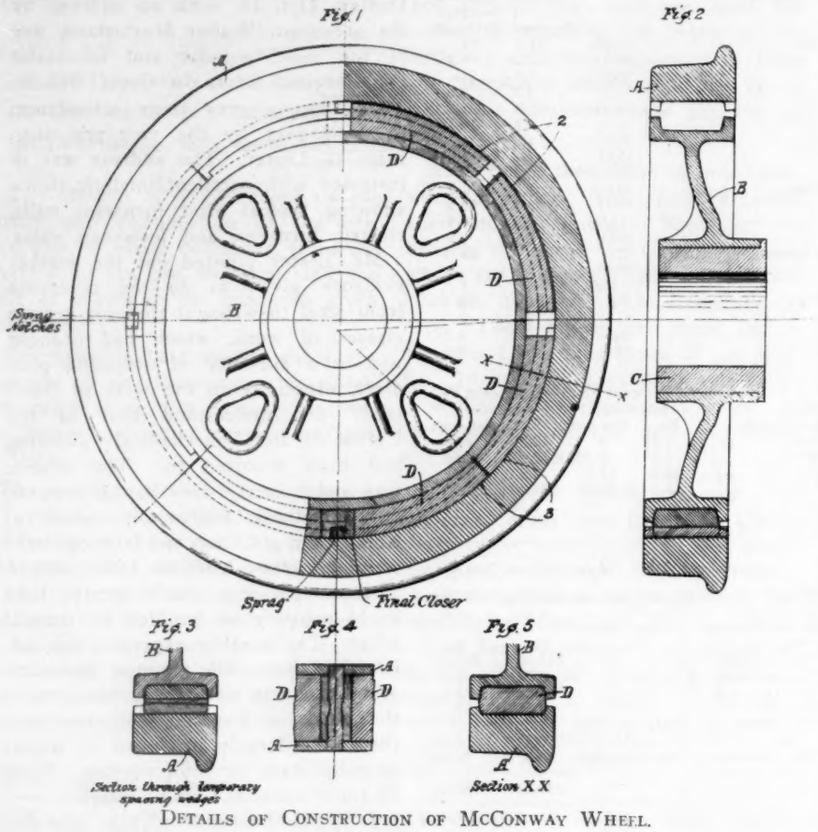
Mr. Musgrove called attention to the severe competition coming from Genoa, where fine rolls were being made and sent into Staffordshire. He understood they worked well and were cheaper. That sort of competition ought to be stopped. He was glad to hear of the continued life in the old Black Country.

Mr. Lester reiterated his statements that the best rolls in the world were made from South Staffordshire cold blast iron.

J. Piper pointed out that 30 or 40 years ago mechanical puddling furnaces were working successfully at South Stockton works, mainly on the Banks principle. The reversion to wrought iron was a real thing, and some of the railway companies were sending out specifications for iron instead of steel.

After the meeting, many members examined the specimens of the new metal duralumin submitted, and were generally satisfied with excellent appearance, and evident strength. In a subsequent conversation with THE IRON TRADE REVIEW representative, Mr.

Macfarlane called attention to the possibility that the discovery of this alloy might lead the way to the development of new industry in Cleveland. That great English ironmaking district has vast accumulations of slag covering great areas, and latterly the only way to get rid of it has been to take it out to sea in barges and dump it overboard. This slag, according to J. E. Stead, the eminent Middlesbrough metallurgist, contains one-seventh of its bulk in aluminum, the recovery of which, provided it can be done cheaply, would be worth an effort. The principal requisite for this recovery is cheap electrical power, and Middlesbrough has this in abundance through the extensive production of electricity by means of blast furnace waste gases. This method, he said, constituted much the cheapest method of electrical generation yet discovered.



DETAILS OF CONSTRUCTION OF MCCONWAY WHEEL.

A New Steel Tired Built-up Car Wheel

A new design of car wheel of the steel tired built-up type is illustrated herewith. The wheel center is a steel casting, the hub is cast iron, and the tire is of the usual rolled steel type.

There is no machine work on the tire except such rough turning as may be necessary to true it up, and for the wheel centers a small amount of grinding and rough turning only is required. There are no bolts, and as the tire is neither fused nor shrunk on, it cannot come off nor turn on the center by reason of any degree of expansion. Separation of the two members, for the renewal of the tire, is effected by cutting the tire in two places, whereupon the structure falls apart, leaving the center ready for the immediate application of a new tire. The application of the new tire can be done by unskilled labor and requires no special machinery; a foundry cupola and lifting appliance adequate to handle units of the weight of a car wheel are all that is required in the way of equipment; in fact, the first wheels of this type were assembled with the use of a portable cupola, melting one ton per hour.

Fig. 6 illustrates the manufacture and assembly of the wheel in the various stages from the centering of the tire to the completed wheel.

Cost of Maintenance.

Commercially considered, the first cost of the initial wheel of this design may be said to be represented by the value of the tire, the cast steel center, the cast iron hub and the cast iron locking wedges.

Renewal of the initial wheel involves

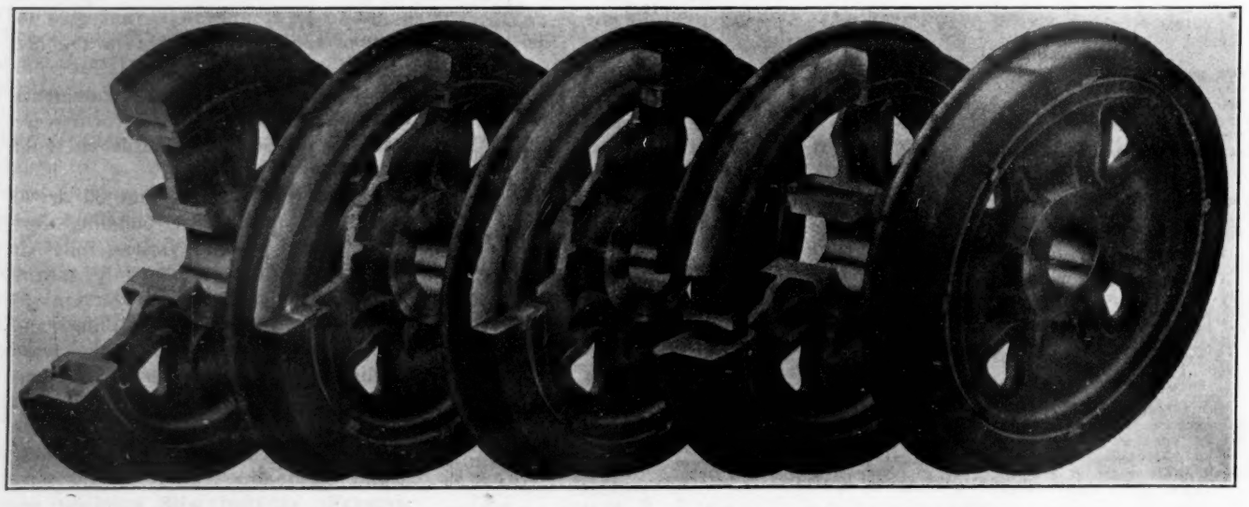


FIG. 6—THE VARIOUS STAGES IN THE ASSEMBLY OF THE MCCONWAY WHEEL.

1. Tire, center and hub assembled; next operation casting locking wedges into space shown between tire and rim of center. To perform this operation, wheel is laid flat and molten iron is poured through annular opening on the side. 2. Locking wedges shown in the first position, the temporary spacing wedges not yet removed. 3. Temporary spacing wedges removed and locking wedges driven home, points of wedges about—but not quite—in contact, and the final spaces left between large ends of wedges. 4. Sprags in place and final closers cast, showing projecting ends of sprags which engage in the inner flange of the tire to prevent revolving of tire on center. 5. Completed wheel.

the purchase of a new tire only as the salvage in the old tire is said to be more than enough to remelt the locking wedges and attach the new tire to the old center, which is itself indestructible by ordinary use, in fact, it is claimed that the salvage from the old tire will pay the cost of removal of the wheel and its return to the axle, which reduces the cost of wheel renewals to that of a new tire.

The general construction of the wheel is shown in the line engravings in which *A* is the tire, *B* the wheel center, and *C* the cast iron hub upon which the cast steel center plate, *B*, is shrunk. Cast iron has been adopted as the material for the hub with the object of obtaining the maximum of security in fit with the minimum of pressure in application.

Assembling the Wheel.

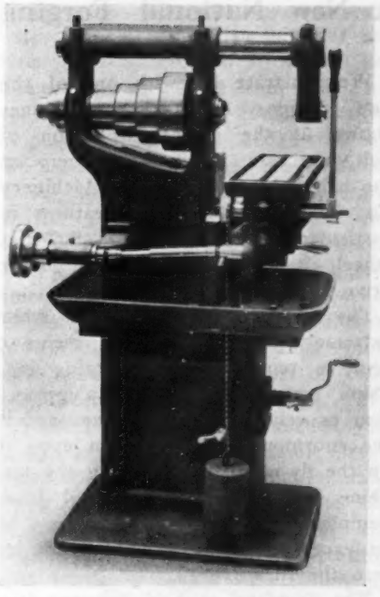
The periphery of the wheel center and the inner circumference of the tire form an annular space divided into eight segments; this division being effected by the spacing wedges used for the temporary union of tire and center preparatory to casting therein the permanent locking wedges, *D*. The locking wedges are in pairs, with points opposed, and when the metal has cooled the shrinkage gives a clearance as in the pair shown at 2, Fig. 1; the temporary spacing wedges being removed, the locking wedges are then driven home and intimate contact obtained as shown at 3, Fig. 1; this operation closes the space—or practically so—between the points of each pair of permanent locking wedges and doubles the space between the butts. At these enlarged spaces are the "sprag" notches in the inner flanges of the tire into which steel sprags, are fitted and thereupon the final closers are cast in place, so completing the circle of locking wedges which are under practically the same compression as if the tire were shrunk on; the sprags embedded in the circle of cast iron wedges and engaging the tire through the notches in the flanges preventing the tire from turning.

The wheel is known as the "McConway," and is manufactured by the McConway & Torley Co., Pittsburg, Pa.

The Great Lakes Engineering Works has issued to the Union Trust Co., Detroit, $1,000,000 5 per cent first mortgage serial gold bonds, covering its properties at Ecorse, Detroit, and a 10-acre site at Ashtabula. Some outstanding bonds will be retired, and the remainder of new issue will provide for the completion of the works.

An Interesting Plain Miller

Herewith is presented a plain miller of medium size which embodies several interesting features which make for an increase in efficiency. It has a novel power feed which consists in the use of a rock which is a quarter section of a screw and which is in constant mesh with a worm gear. This method it is claimed gives a smoothness of cut not attainable in the ordinary rack feed machine, whose tendency to chatter is avoided by the curved teeth of this peculiar form of rack. The worm gear is driven by a short worm and gear from the feed shaft, which is of the regular type. Another feature of the machine is a provision for a quick return of the carriage when the feed stops, which is often very desirable, especially on such work as fluting taps or reamers. This is accomplished by means of a short drum on the cross shaft carrying the worm gear in mesh with the rack. On this drum is wound a wire cable carrying a weight which, when the feed is released, immediately falls and, unwinding the cable, returns the machine table. The exact point at which the table will stop is determined by means of a special clamp by which the length of the cable is easily adjusted. A crank handle is used interchangeably on the elevating screw, cross feed and table feed, the latter being provided with a device for keeping the crank from falling off; a hand lever is also furnished to use on the feed shaft to provide for hand feed on light, rapid work. The working surface of the table is 8 x 23½ inches and drops 7½ inches from center of spindle. The movements of table are, horizontal 15 inches, vertical 7 inches and cross feed 3 inches The spindle, which is bored for No. 10 B. & S. taper, runs in bronze bearings which are provided with adjustment for wear. The elevating and cross feed screws are provided with graduated collars which may be set in any position. The entire feed mechanism is protected by a guard not shown in the illustration. The machine is furnished with either oil drip cup or pump, in which case the tank is placed in the base of the machine. The machine is driven by a 2½-inch belt, the feed belt being 1 inch. The weight of the machine is 900 pounds and the builders, Bickford & Washburn, Greenfield, Mass., advise that they have under way designs for a larger and nearly identical machine which is to be back geared and weigh about 1,500 pounds.



THE BEDFORD & WASHBURN MILLER.

A New Straightening Press

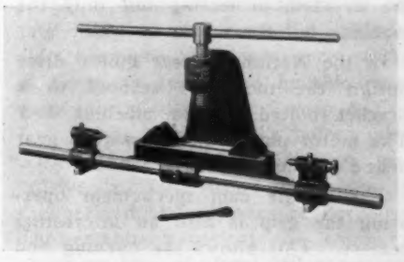
A new design in bench straightening presses manufactured by the P. A. Geier Co., 5112 St. Clair avenue, Cleveland, is illustrated herewith.

The engraving shows the No. 1 size, which has a capacity for straightening cold stock up to 2 inches diameter and is used for straightening shafts, arbors, forgings, drills, reamers, spindles, broaches, etc.

The body is of box type pattern, heavily reinforced to withstand the strains to which these tools are often subjected, and all other parts are sturdily constructed to give the greatest efficiency and power.

The V blocks are movable along a groove in the bed and the centers are adjustable to accommodate the length of work. The thrust block on the screw is of case-hardened steel and the adjustable centers are of hardened tool steel. The bracket supporting the centering shaft serves also as a hand support in testing the work.

The body of the No. 1 press is 13 inches high, the length of the centering shaft is 40 inches, and the tool weighs 135 pounds net, complete.



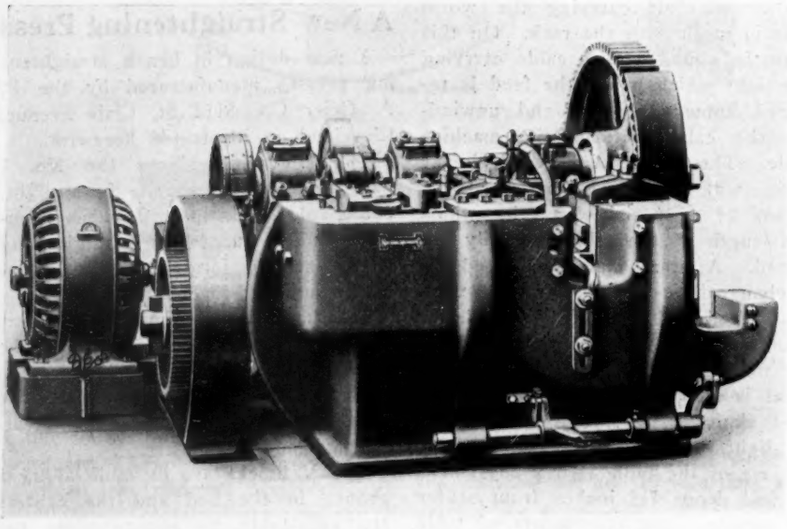
GEIER STRAIGHTENING PRESS.

A New National Forging Machine

We illustrate herewith one of the new designs of forging machines shown at the recent exposition of bolt, nut and forging machinery at the works of the National Machinery Co., Tiffin, O. The new features in particular are the "friction slip" fly-wheel design and the direct motor drive construction.

The "friction slip" fly-wheel, while extremely simple in detail, meets a positive requirement in forging machine construction. It is a protection or relief to the machine against the enormous strains thrown upon it by the fly-wheel inertia when the machine "stalls" or is prevented from completing the revolution because of an excess of stock or cold metal fed into the dies.

The fly-wheel is held between friction flanges which are keyed to the shaft. When excessive material or cold stock is fed into the machine and prevents the heading tool from completing a full stroke the fly-wheel slips between these friction flanges. The inertia of the fly-wheel is thus absorbed in friction and the excessive strains set up by a rigid fly-wheel are avoided, protecting not only the machine but the motor as well.



THE NATIONAL FORGING MACHINE WITH SLIP FLY-WHEEL.

In the National direct motor drive design the motor is secured to a bracket bolted to the machine bed The motor pinion meshes with a gear belted to the friction fly-wheel.

The double cam mechanism operating the grip is also an interesting feature. This allows the opening and closing of the dies to be timed so as to give unusually large upsetting or gathering capacity and this makes possible a wider range of work and more intricate forgings with fewer operations.

These machines are built in sizes of 1½, 2, 2½, 3, 3½ and 4 inch capacity. The illustration shows a 2-inch machine and shows the motor application and friction slip fly-wheel very clearly.

Baird Machine Co.

The Baird Machine Co., Oakville, Mass., manufacturer of tumbling barrels, etc., has acquired a tract of land near Bridgeport, Conn., and it is the intention of the officers of the company to shortly remove its plant to the new location. A force of men is now at work laying out the grounds and a new plant is in the course of construction.

The Baird Machine Co. is the third concern which Mr. Baird has gotten under way, its predecessors having been the Baird Pin Co, Oakville, Mass., and the Baird & Warner Co., the forerunner of the present concern. The company now employs about 150 men and expects to add considerably to its working staff and its equipment when in the new Bridgeport plant.

The United States Metal Door & Trim Co. has filed articles of incorporation with the secretary of state at Albany, N. Y. A nominal capital stock of $1,000 was fixed in the certificate, but action has been taken increasing the stock to $8,000,000, of which $2,000,000 will be 7 per cent preferred and the remainder common stock.

Sheffield's Iron and Steel Industries

Sheffield is one of the oldest iron and steel centers of the world. The iron ores of the district have been worked almost from time immemorial; they consist of clay ironstone, a ferrous carbonate with clay, and usually contain considerable quantities of phosphorus. Though pig iron made from these ores is excellent for foundry and wrought iron purposes, the early association of Sheffield with products of high-tempered steel made it necessary to seek for iron of different quality. Consequently, Sheffield was one of the earliest importers of iron from Russia, Styria, Sweden and Spain. The antiquity of this industry is attested by ancient historians, and by the reference in Chaucer to "a Shefeld thwytel." Up to 1740,. steel articles were made from blister steel, from shear steel or from natural or puddled steel. In that year the steel industry of Sheffield took a new departure when Benjamin Huntsman, a clockmaker of Doncaster, discovered the secret of crucible cast steel. The process is still carried on by his descendants on the site of his factory at Attercliff, now part of Sheffield.

Rise of the Bessemer Firm.

In 1856, Henry Bessemer and partners founded the firm of Henry Bessemer & Co., in Sheffield, to carry out the Bessemer process, and soon afterwards the Siemens-Martin, or open-hearth process, also came into use in the town. At one time, Sheffield had a large output not only of structural steels and special steels for the general heavy trade, but also railway materials, but owing to expenses of transit, the district has only retained, as regards railway work, the special qualities of such steels as are used for tires, axles, etc., the coast towns having competed successfully with it in regard to rails. About 1900, the Americans took up vigorously the subject of self-hardening tool steel based on the discoveries of Mushet, but Sheffield discovered how to produce a special type of high-speed steel, and claim to have regained their ascendancy. The Sheffield steel contained anything from 10 per cent to 20 per cent tungsten with 2 per cent to 6 per cent of chromium, very much lower carbon than formerly, and it was hardened from about 1,300 degrees Cent. In 1908, another improved high-speed steel was produced in Sheffield, by the addition of one or other of the rare elements, a modification which

it is said produces a steel that lasts four times as long as the previous best high-speed steel. Sheffield has now about 400 works engaged in the manufacture of steel and steel articles.

Diversity of Products.

Among the most famous of its industries is the production of armor for fighting ships, as well as of heavy ordnance, and projectiles. For one of the earliest British floating batteries, the Terror, the armor plates were rolled by Samuel Beale & Co., whose works were afterwards taken over by the Parkgate Iron Co. These plates were 3 to 4½ inches thick. Then commenced the battle between guns and armor plates. The steel tubes for the early Armstrong guns were produced at the River Don works of the Vickers company, and in subsequent developments of the attack this firm has to the present day played a prominent part. On the other side may be noted the compound method of producing armor introduced in 1879 at the Atlas Steelworks, Sheffield, of Messrs. John Brown & Co., Ltd. This consisted in welding the wrought iron plates to separate hard steel plates. Compound armor of another class was subsequently introduced by Cannells, of the Cyclops works, Sheffield. It was left to the Vickers company to produce the first all-steel hardened plates. This departure was made in 1888, and four years later the same company was the first in Europe to make a plate by the Harvey process. Five years ago Hadfield's Steel Foundry Co., Ltd., Hecla works, Sheffield, introduced their "Era" steel armor, an alloy containing manganese and other metals. Projectiles of forged steel are made by the Vickers company, Thomas Firth & Sons, and the Hadfield Co. The three armor producing firms in Sheffield, John Brown & Co., Cammell Laird & Co., and Vickers Sons & Maxim, are able to produce an aggregate of 30,000 to 40,000 tons of armor per annum, sufficient for eight battleships.

Vickers Sons & Maxim.

Taking the procedure at the works of Vickers, Sons & Maxim as typical, the process of manufacture of armor plating may be thus described. The ingot cast is sometimes of 50 tons weight. The constituents of the furnace charge are a secret of the manufacturers. In some works the ingot is slabbed down; in the hydraulic press at the River Don works it is cast in the form of a slab, and then passed to the rolling mills. The mill has two rolls 13 feet 3 inches long, 40 inches diameter, made of forged and hardened nickel steel, and the two screws for setting down the top roll, which determines the thickness of the slab, are 10 inches in diameter and are operated by an engine. Hydraulic cylinders are used for raising the top roll, which weighs 20 tons. The live roll table of the mill is 67 feet in length. The plates are rolled down in some cases from 36 inches to 6 inches in one heat, the time taken being 30 minutes, and as many as five ingots can be dealt with per day. The first process in the hardening treatment consists in adding considerably to the percentage of carbon in the face of the plate. The carburizing process is carried out in one of thirteen furnaces ranging in length up to 44 feet and fitted so that as many as eight plates may be dealt with simultaneously in one furnace.

The Atlas Works.

The furnaces are gas-fired and have air and gas regenerating chambers underneath. A period of 10 or 12 days is required for carburizing, but having such a large number of furnaces the company can deal with four plates per day. Before being subjected to chilling and heat treatment in special oil and other baths, the plate is bent to the form required in an 8,000 ton hydraulic press, and subjected to the necessary machining. As indicating the amount of work required to insure absolute precision, it may be stated that the weight of the finished plate is equal to only about one-third of the original ingot. Vickers Sons & Maxim not only manufacture all the heavy parts required for every branch of naval construction, but they have their own ship building and marine engineering establishments at Barrow, their ordnance works at Erith, and their electric and ordnance accessories at Birmingham. At their Barrow yard, they recently launched the Vanguard, a battleship of the Dreadought type, which created a world's record in rapidity of construction.

The Atlas works, famed as the birthplace of the British armor-plate industry, were founded about 55 years ago. Mr., afterwards Sir John, Brown, acquired in 1854 a small establishment known as the "Queen's Steel works," which he reorganized as the Atlas works, with the aid of his partners, John D. Ellis and William Bragge. The works, now opened by a limited company with a capital of $5,000,000, have an area of 48 acres in Sheffield, and at Clydebank, of 78 acres. The company also owns extensive collieries. Its turnover has risen from $200,000 to $20,000,000 per annum, and its output from 5,000 tons to close upon 100,000 tons, while its employes total about 20,000. In addition to armor plates, the company makes marine and other engine crank shafts, shafting of all kinds, gun forgings, boiler tubes and furnaces, steel castings of all descriptions, tool steel, railway tires and steel wheels. Recently, in view of the introduction of turbine machinery, rolling mills have been installed at a cost of $500,000, for rolling steel cylinders. The ingots as cast are first punched vertically in a 3,000-ton hydraulic press. They are then drawn longitudinally by a second hydraulic press to the desired length. After machining, the ring is placed in a powerful rolling mill, having a capacity for rolling up to 15 feet diameter, 10 feet long, and up to a weight of 30 tons. This process has in most cases superseded the production of the cylinders from hollow forgings, and the company has made most of the turbine drums required for recent British built vessels, and including the two White Star ships now being built by Harland & Wolff at Belfast.

Cammell Laird & Co., Ltd.

The business of Cammell Laird & Co. was founded by Charles Cammell in 1837 in the steel and file trade. In 1845 the Cyclops works were built for the manufacture of railway construction and equipment. The Wilson compound armor-plate was introduced about 1885 by Sir Alexander Wilson. Ultimately, by amalgamation with Laird's of Birkenhead, a great combine was formed under the name of Cammell, Laird & Co., Ltd. The firm owns the Yorkshire Steel & Iron Works, acquired in 1864, and works at Grimesthorp and at Workington on the northeast coast, the last named having been acquired in order that the manufacture of steel rails might be carried on under more favorable terms near the coast. By the amalgamation in 1902, with Laird, the firms secured the advantages enjoyed by other manufacturers of armor in being able to build a battleship complete. The ordnance works at Coventry are owned by this company jointly with John Brown & Co., Ltd., while to Cammell's belong also Solway Iron Works, Maryport, extensive hematite iron ore mines in Cumberland and colleries at Barnsley. The establishments of the company cover an area of about 250 acres and employ upwards of 15,000 men, while

the annual output of steel exceeds six hundred thousand tons. The operations in the various works cover almost every department of steel manufacture from armor, heavy steel marine forgings, castings, and gun forgings, to files and other light steel goods. The first ships armored by Cammell's were the Lord Clyde and The Royal Alfred in 1854, and since that date they have furnished the armor for over 250 ships. A new armor plate mill just put down at the Grimesthorp works is the most powerful of its kind. Each of the main rolls for this mill weighs 42 tons and was forged from an ingot weighing 82 tons. At these works are also produced heavy guns, projectiles of every description, crank and propeller shafts for the largest war and merchant ships, railway tires, and steel forgings and castings of any weight up to 100 tons. The works include a number of 40-ton and other Siemens Martin furnaces arranged so that several can be tapped into one large casting pit. There are four steel foundries.

Hadfield's Steel Foundry Co., Ltd.

Two steel works are owned now by Hadfield's Steel Foundry Co. The original works known as the "Hecla" works were established at Attercliff in 1872 by the late Sir Robert Hadfield, well-known for his researches into the properties of steel and the discovery of manganese steel. The expansion of the business was so rapid that in 1897 the East Hecla works, Sheffield, were commenced. The original Hecla works are now devoted exclusively to the manufacture of projectiles. The firm has supplied to the British government over a million and a quarter projectiles of all descriptions from the 13.5 inch shell, weighing over half a ton, to the small 12-pounder. The "Era" steel has been adopted very largely by the British government for structures on board warships, and among the sights of the works are various structures which have been experimentally attacked by gun fire. The East Hecla works have an area of 90 acres. The steel foundry is said to be the largest and most completely equipped in the world, being 1,020 feet long and covering six acres. The annealing shops, three in number, cover an area of 80,400 square feet; there are 35 annealing furnaces with overhead electric cranes, the heat treatment of steel here carried on being an important part of the Hadfield process. The fettling shops, grinding shops, smith's shops and cabinet shops are of corresponding dimensions, and cover a total area of 110,000 square feet, while the pattern store and machine shops and other auxiliary departments are on a similarly large scale. The whole establishment is well furnished with the latest electrical cranes and other machinery, the power station having seven units in a total of 4,000 horsepower. The total number of hands employed at both works is over 4,000, and elaborate laboratories and scientific staffs are maintained. Locomotive wheel centers, carriage and wagon castings and other railway work are largely produced. For general engine building, the castings include steel cylinders for hydraulic work up to 27 feet in length, with rams, gearing, and other parts. Dynamo rings up to 17 tons weight each have been made. Hadfield's are also large manufacturers of castings for marine engineering purposes.

Thomas Firth & Sons, Ltd.

Another typical Sheffield firm is that of Thomas Firth & Sons, which began in 1840, and, like the others already described, in a very small way. The firm now owns the Norfolk works, shot forge, West gun works, East gun works, steel foundry, file, saw and edge tool works, and the new tool steel works and rolling mills at Tinsley, in addition to large works in Riga, Russia, and a considerable interest in the Firth Sterling Steel Co., which has extensive works at McKeesport, Pa., and Washington, D. C. Some five years ago, the firm became allied to John Brown & Co., who own the Atlas works at Sheffield, the Clydebank ship yards, secured a very considerable interest in the business of Harland & Wolff, Belfast, and various other undertakings. The Norfolk works cover more than 40 acres, and in the crucible department the output is from 5,000 to 6,000 tons of high grade crucible steel per annum used for tools, parts of small-arms, bicycles, sewing machines, motorcars, etc. A few years ago, when crucible steel was used for heavy ordnance, the firm was turning out at the same time steel wire for needles and tubes for 110-ton guns. The Tinsley steel works cover 20 acres. The mills are so arranged that the ingots are delivered at one end, and the finished material deposited in store rooms at the gates. The plant includes 18-inch, 12-inch, 10-inch, and two 8-inch rod, and bar mills as well as 20-inch, 18-inch, and 16-inch sheet mills. Each mill is driven by its own electric motor. The forge contains steam hammers ranging from 300 pounds to 3 tons. The crucible furnaces are gas-fired. A pneumatic service at 100 pounds pressure is used for working hoists, etc. There are four furnaces in the Siemens-Martin department, ranging from 40 tons to 10 tons each, with which ingots of nearly 100 tons each can be turned out. There has also been installed a complete fluid compressing plant. Castings up to 45 tons each for turbine drums, hydraulic and other engineering work are made in the steel foundry. The research department is large and well equipped.

President Stead's Remarks.

J. E. Stead, president of the Chemical section of the British association, which has just concluded its annual meeting at Sheffield as noted elsewhere, said:

"The one great change in Sheffield since I have known it, is that, whereas it absolutely despised anything like scientific application to its trades in the old times, it is now running after it, and thoroughly appreciates the advantages of scientific training. There is rising, in the Sheffield works, a demand for highly-trained technical men, and in that respect Sheffield is keeping pace with similar intelligent progress in other parts of the world."

At the same time, Mr. Stead expressed great admiration for the practical work of Sheffield. "That which is scornfully referred to as rule of thumb," he said, "should not be spoken of in that tone, because the rule of thumb systems that have been carried out in Sheffield are the results of generations of experience and are of immense importance. Sheffield must not lose her rule of thumb. It has placed her in the premier position in the world as regards the manufacture of high-class steels. She is now supplementing that practical experience with scientific research, which ought to place her in a still higher position."

Mr. Stead also spoke appreciatively of the training in the metallurgy of iron and steel which is given at the Sheffield University. "I don't think there is anything better anywhere," he declared. "I have come in contact with the students, and find that they have a very high order of merit in knowledge, both theoretical and practical, of the processes of steel manufacture. I consider that the men who are trained in the metallurgical department are likely to fill very important positions in the future."